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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Oils and Fats Problems

AMONG the substances that are essential in human diet the various fats stand out in importance above all others. For this reason the extent of our present resources and the means at our disposal for augmenting them are matters of extreme interest. It has been said that as yet the fats have not been studied to the extent they deserve owing to the extreme complexity of the subject; nevertheless, progress of an almost revolutionary nature has been made, which in times of national emergency should eliminate all possibility of a condition of fat deficiency. One cannot approach the subject of the vegetable oils and fats without recalling the unusually suggestive address, entitled "A Neglected Chapter in Chemistry," which Dr. E. F. Armstrong delivered when occupying the presidential chair of the Society of Chemical Industry a couple of years ago. The address, while containing a mass of technical knowledge, reflected the possibilities that still await the research worker, and left the impression that, certainly from the physiological standpoint, many of the present hypotheses are little more than tentative. As regards the fats themselves, their characteristics naturally vary to a great extent in accordance with their origin, animal products showing the widest difference. On the other hand, the outstanding characteristic of the vegetable fats is their fixity of composition, and although they are drawn from all parts of the world they show a minimum of variation. It is, however, only necessary to examine the long list of oils and fats that can now be turned to commercial account in order to realise that the industrial chemist finds inconsistencies of origin and composition of small account.

Prejudice apart, however, the manufacturer is faced with many obstacles. In addition, for instance, to having to combat probably ill-informed theories as to physiological properties and nutritive value, he is confronted with such questions as taste, colour and consistency, which, even though they may have little or no connection with fundamental food value, are of considerable importance from the commercial point of view. Even the general public now recognises that there is no valid ground for objecting to hydrogenated oils, and it may, therefore, be assumed that the case for synthetic fats is proved so far as digestibility, and consequently food value, is concerned, although it is recognised that they could never fully replace the natural products.

The question is different, perhaps, when consideration is given to the propriety or economy of converting mineral oils to foodstuffs. As is pointed out elsewhere in this issue, there are both economic and chemical considerations that make the proposition an extremely speculative one, mainly because the supply of vegetable oils is almost unlimited and is renewable annually, whereas the supply of petroleum oils can scarcely keep pace with the demand. Claims for the successful production of fatty acids by the oxidation of petroleum products emanated almost without exception from wartime workers in Germany, and although their work must not be discredited it certainly remains a somewhat remarkable fact that a repetition of their experiments by other workers appears to have proved very little. For the moment it would seem that there is more than enough to occupy research workers in the investigation of problems associated with their orthodox products and practice, and the possibility of utilising natural hydrocarbons can scarcely be regarded as anything more than of academic interest.

Chemical Control in Industry

THE need for chemical control in industries that undertake operations of an essentially chemical character has been emphasised for many years. The European war, it was believed, had disclosed once for all the necessity for careful chemical control; yet to-day there are several industries carrying out what cannot be regarded as other than chemical operations, which are practically uncontrolled from a chemical point of view. The galvanising industry is a case in point. The pickling of sheet iron in dilute hydrochloric acid, for the removal of dirt and scale, the cleansing of the

zinc bath prior to the dipping of the pickled sheet, the use of muriate of ammonia in connection with the latter operation, and the recovery and utilisation of waste pickle liquor, zinc ashes, and flux skimmings are all operations involving for their efficiency and economy chemical control and supervision.

Singularly few galvanising works provide any such control. Complaints are made arbitrarily concerning the strength or purity of the hydrochloric acid used in the pickling process. The fault lies not with the raw material but with the characteristics of the partially-spent pickle liquor, to which acid is added from time to time for revivification purposes. The waste liquor is generally discarded when a certain specific gravity is reached, but this may be due to one or more causes. The free hydrochloric acid content may be unduly high or the ferrous chloride concentration may have become abnormal. In any case, not only is it important to work to certain well-defined limits as regards free hydrochloric acid content and ferrous chloride concentration if loss of acid is to be avoided, but it is conceivable that the utilisation of waste pickle liquor would be rendered much more easy if a definite standard were adhered to. Any such standard must ensure that the maximum quantity of sheet iron is dealt with satisfactorily per unit weight of acid used, and this standard should bear some relation to the chemical characteristics of the waste pickle liquor best adapted to admit of ready and economic treatment.

The operation of cleansing the zinc bath by the application from time to time of crystals of muriate of ammonia is imperfectly understood, and, pending accurate knowledge of what occurs, it is impossible to say with any degree of precision what are the quality and characteristics of the muriate of ammonia best suited to the special requirements in question. How far moisture content and crystal structure affect the user of muriate of ammonia is a matter of uncertainty at present. Galvanisers complain occasionally that the material which they receive is too wet; at other times it is reputed to be too dry. Yet the moisture content hardly varies more than 0·5 per cent. Again, some prefer uniformly small crystals; others demand medium-size hard crystals. That such vagueness and empiricism should surround the problem in these days of enlightenment is a matter for reproach. It must be recognised that, if there is to be progress and our industries are to meet foreign competition, it is impolitic to refrain from employing chemists when the nature of the work is essentially chemical. This is all the more evident in the case of the galvanising industry when one examines the by-products which are at present disposed of in a more or less haphazard way.

Waste pickle liquor could be utilised in the production of muriate of ammonia if a suitable process was adopted. Equally, an appreciable quantity of muriate of ammonia could be recovered inexpensively from flux skimmings. Again, it is conceivable that zinc ashes and flux skimmings could be disposed of more advantageously than is the case to-day. What relates to the galvanising industry applies to several other industries. It is high time that the importance of the work of the industrial chemist was recognised by *all* industries. His employment will almost invariably prove a sound investment.

British Money for German Industry

RECENTLY in the financial world there have been one or two noteworthy illustrations of the readiness of the British investor to partake in what is confidently believed to be a revival in German industry. The movement really began with the substantial German loan which followed the introduction of the Dawes' scheme, while the eagerness of the home investor to obtain a footing in Germany was again exemplified by the heavy over-subscription of the £5,000,000 of 7 per cent. bonds of the Potash Syndicate. Now, during the present week, subscriptions have been invited by an English financial house for £600,000 preference shares in the International Pulp and Chemical Co., which is acquiring practically the whole of the capital of the well-known German Koholyt undertaking. This undertaking already owns five freehold factories in Germany, of which the two at Königsberg are believed to constitute one of the largest organisations for the production of high-grade chemical pulp in the world, the others being devoted to the production of paper, chlorine, caustic soda, and materials employed mainly in paper making. The Lulsdorf factory on the Rhine, which is included in the group, is, of course, one of the largest works in Germany for the production of chlorine and caustic soda by the electrolytic process. The passing of this substantial German undertaking into British control is a significant sign of the times, for it points to a direct reversal of the pre-war position, when so many German financiers were interested in British enterprises.

Closely following on this, comes a statement by the *Financial News* that it has good reason to believe that negotiations have almost been completed for the issue in London shortly of a loan by the great German dyestuffs combine, which recently replaced the old Interessen Gemeinschaft, namely, the I. G. Farbenindustrie Aktien Gesellschaft. A sum of £7,000,000 is mentioned as the probable sum required, but this may possibly be an exaggerated figure. Whether for this or some other reason, the price of the original German Potash Loan, which rose to a premium of nearly £5, has recently receded slightly. There is one essential difference in the potash and the dyestuffs position. With the exception of the potash mines in Alsace, Germany has practically a world monopoly of natural potash deposits, and at the moment these are not threatened by any synthetic material or by other deposits waiting to be developed. In the matter of dyestuffs, an important fact is the enormous development of home production in a large number of countries that before the war largely depended on German supplies. The productive capacity almost everywhere equals or exceeds the demand and competition is and must continue to be extremely keen. Another factor to be taken into account is the attitude of British dyestuff interests towards the proposed loan in this country. No definite opinion, however, can be expressed on this point until more authoritative information is available.

A contrast with this tendency to finance German undertakings is the conversion of British Drug Houses, Ltd., into a public company and the issue of 242,000 5 per cent. cumulative preference shares and 400,000

ordinary shares of £1 each. British Drug Houses, formed in 1908, is a combination of a group of the oldest and most reputable chemical manufacturers in this country. The units were essentially British concerns from their earliest days, and since the war, in their combined form, they have been, if possible, more British than ever, in the sense that with real public spirit they have developed the home manufacture of numerous essential fine chemical products, the market in which was formerly dominated by Germany, and have appreciably helped to recover a good name for British chemistry. Nor is their outlook confined to the home markets; latterly export trade has been opened up, and in the Colonies, as at home, the reputation of British chemical productions is steadily being raised by their enterprise. These public aspects are all well worth taking into account, as well as the fact that the management is in the hands of a particularly practical, trustworthy, and highly qualified directorate.

Tributes to British Glassware

IT is satisfactory to find users of British chemical glassware testifying to the enormous advance made of late years in the manufacture of British glassware and to the high quality of the finer grades of glass now produced by British firms. So good an authority as Professor Turner, of the Glass Technology Department of Sheffield University, has committed himself without reservation on this point. "I have come definitely to the conclusion," he states, "that for range of compositions available, for resistance to the attack of chemical reagents, and for general all-round excellence, there is no country in the world which surpasses or even equals our own at the present time in its types of glass beakers and flasks." Now we have the equally clear testimony of Sir Alfred Mond. "British laboratory glassware and porcelain," he states, "are exclusively used in the laboratories of Brunner Mond and Co., Ltd., and I am assured by their chief chemist, Dr. F. A. Freeth, F.R.S., that the supplies are not only entirely satisfactory but are superior to those from any foreign source." In the face of such opinions it is hardly necessary to point the moral, namely, the duty of British users of chemical glassware to follow the Brunner-Mond example. What is good enough for the laboratories of this company is good enough for the best.

Naphthalene as a Motor Fuel

IN reference to the editorial note on "Naphthalene as a Motor Fuel," which we published on February 13, a correspondent who is in the research department of a large company in the North of England sends us an interesting note. "The use of naphthalene as a motor fuel," he writes, "was suggested before 1914. Packets of the powdered material, tinted blue and red, were on sale at motor shops at least two or three years before that under some such name as 'Sparks.' The instructions were to dissolve in the petrol and increased power was claimed. A friend of mine tried it on his motor cycle, and I also tried it on a hill test in a friend's car with marked increase in power. Some carburetter adjustment was necessary. The chief trouble was crystallisation of the naphthalene round the carburetter jet after standing. I have had no experience with the use of naphthalene in a molten condition, but no doubt you know that this has been applied to increase the illuminating power of gas, before the use of mantles became common, in the albo-carbon type of burner."

Books Received

LAUNDRY CHEMISTRY. By A. Harvey. London: Crosby, Lockwood & Son. Pp. 116. 4s.

CONCERNING THE BLEACHING INDUSTRY. Compiled by Sir Alan John Sykes. Manchester: Bleachers' Association, Ltd. Pp. 120.

A DICTIONARY OF APPLIED CHEMISTRY. Vol. VI. By Sir Edward Thorpe. London: Longmans, Green and Co. Pp. 791. £3.

RECENT ADVANCES IN PHYSICAL AND INORGANIC CHEMISTRY. By Dr. Alfred W. Stewart. London: Longmans, Green and Co. Pp. 312. 18s.

QUALITATIVE INORGANIC ANALYSIS. By Dr. D. R. Snellgrove and Dr. J. L. White. London: Methuen and Co., Ltd. Pp. 280. 7s. 6d.

THE FUNDAMENTAL CONCEPTS OF PHYSICS IN THE LIGHT OF MODERN DISCOVERY. By Dr. Paul R. Heyl. London: Baillière, Tindall and Cox. Pp. 112. 9s.

THE B.D.H. BOOK OF A. R. STANDARDS. London: The British Drug Houses, Ltd. Pp. 112.

The Calendar

Mar.		
1	Oil and Colour Chemists' Association: Joint Meeting with the London Section of the Society of Chemical Industry. "Methods of Grinding." 8 p.m.	Burlington House, Piccadilly, London.
1	Institution of the Rubber Industry (London Section): "Some Difficulties of Rubber Manufacture," J. H. C. Brooking. Discussion on "Recent Developments in General Mechanicals," opened by H. Rogers. 8 p.m.	Engineers' Club, Coventry Street, Piccadilly, London.
2	Institute of Metals (Birmingham Section): "Light Alloys." Dr. L. Aitchison. 7 p.m.	Chamber of Commerce, New Street, Birmingham.
2	Hull Chemical and Engineering Society: "The Development of the Activated Sewage Sludge Process." William Lockett. 7.45 p.m.	Grey Street, Park Street, Hull.
2	Institute of Metals (N.E. Coast Section): "Bearing Metals." R. T. Rolfe.	Armstrong College, Newcastle-on-Tyne.
3	Oil and Colour Chemists' Association: Annual Dinner. 7 p.m.	Grand Hotel, Northumberland Avenue, Trafalgar Square, London.
3	Society of Public Analysts. 8 p.m.	Burlington House, Piccadilly, London.
4	Chemical Society: Ordinary Meeting. 8 p.m.	Burlington House, Piccadilly, London.
4	Institute of Chemistry (Bristol and S.W. Section) and the Society of Chemical Industry.	Chemical Department, University, Bristol.
4	Royal Society: Discussion Meeting on "The Electrical State of the Upper Atmosphere," opened by the President, Sir Ernest Rutherford. 4.30 p.m.	London.
5	Society of Chemical Industry and Institute of Chemistry (South Wales Section): Informal Joint Dinner. 6.15 p.m.	Thomas' Café, High Street, Swansea.
5	Society of Chemical Industry (Manchester Section) Joint Meeting with the Manchester Society of the Institution of the Rubber Industry: "The Accelerator Action of the Di-Abd Tri-Arylguanidines." W. J. S. Naunton.	16, St. Mary's Parsonage, Manchester.
8	Institute of Metals (Scottish Section): Annual General Meeting. "Nickel and its Alloys." W. R. Barclay. 7.30 p.m.	39, Elmbank Crescent, Glasgow.

Future Sources of Oils and Fats

The conversion of the liquid vegetable glycerides into hard solid fats marked a great progressive step in industrial chemistry, and although the immediate results have not been of so revolutionary a character as was at one time predicted, much has been done to justify the hope that fats so obtained will, to a large extent, make us independent of the animal fats. The problems of the future and the possible manner of their solution have been admirably dealt with by Dr. W. W. Myddleton and Mr. T. Hedley Barry in their recent volume on "Fats: Natural and Synthetic" and some of their more important conclusions relating to the use of mineral oils are set out below.

THE tremendous rôle which the mineral oils play in modern life naturally suggests to the chemist that these might be converted into fatty acids and hence into glycerides. There are, however, both economic and chemical considerations which make this proposition an extremely speculative one at the present time. The supply of vegetable oils is almost unlimited, and, further, is annually renewable, whereas the supply of petroleum oils can hardly keep pace with the demand, and, although we have only been drawing upon the natural resources for a few years, there are many reasons for fearing that we have already exhausted a large proportion of the available natural store. Consequently, even if the chemist were able cheaply and expeditiously to produce food-stuffs from petroleum, the chances of making the process a permanent economic success do not appear to be very great at the present time. There are, however, large quantities of more or less waste products from distillation processes which contain large proportions of hydrocarbons which might conceivably yield to chemical manipulation products which would be of value.

From the chemist's point of view the problem is one of extreme complexity. Petroleum consists of an enormous number of compounds, many of them possessing cyclic or branch-chain structure. Recent work, in fact, indicates that the proportion of straight-chain hydrocarbons is extremely small, even in Pennsylvania petroleum, which was generally considered to be a typical mixture of straight-chain hydrocarbons. Our knowledge of the chemical composition of the ingredients of natural petroleums is as yet very limited, and the difficulties involved in separating individual members are considerable.

Distillation alone is not satisfactory, since many of the compounds undergo decomposition, a fact which is extremely useful to the refiner in that it enables him by varying his process to increase the yields of the valuable low boiling-point products which are suitable for motor fuels. Many workers have succeeded in oxidising paraffin wax and similar residues with the aid of catalysts, and claim to have obtained high yields of acids. Thus Fischer and Schneider by heating paraffin wax with sodium carbonate solution under pressure at 170° C. and passing in air obtained a series of acids from which they isolated those having the formulæ:

$$C_{19}H_{38}O_2,\ C_{17}H_{34}O_2,\ C_{15}H_{30}O_2,\ C_{13}H_{26}O_2.$$

Various catalysts—lead, manganese, vanadium, etc.—have also been used. Kelber working with vaseline and similar products found that good results could be obtained by using manganese as a catalyst at 140° C. An interesting extension of this mode of attack was made by Franck, who studied the action in the case of lignite and low-temperature tar oils. He states that the acids obtained were suitable for soap manufacture and could be esterified to form glycerides of an edible quality.

Conflicting Results

It will be noted that those claiming the successful production of fatty acids by the oxidation of petroleum products on a commercial scale are almost without exception workers in war-time Germany. Although this work must not be wholly discredited, the fact remains that very contradictory reports are current as to the results obtained by workers attempting to repeat their experiments or to apply them upon an industrial scale. The work, in fact, is often of a purely empirical "hit or miss" type, and in view of the indefinite nature of the raw materials it is not surprising that different results should be obtained by different workers.

More systematic, though less sensational, is the work of those endeavouring to unravel the composition of the raw materials. The work of Francis upon the constituents of paraffin wax may be mentioned as showing the complexity of the substance and the various courses which oxidation may take. The more scientific work on this subject reveals the fact that not only are the chemical individuals constituting petroleum of an extremely complex nature, but that the reactions involved in their oxidation are very sensitive to variation in condition, and may produce dibasic and hydroxy acids and also proceed to the extent of splitting off carbon atoms entirely. Another line of work involves the use of ozone. Here again the control of the reactions is difficult, ozonides being formed which break down to compounds of lower molecular weight. Harries suggests that these ozonides can be decomposed by steam to peroxides and converted into salts of the higher fatty acids by treatment with caustic soda. The yields, however, are so small and the cost of the production of ozone so high that the process does not come within the sphere of practical application.

From the foregoing it will be seen that the oxidation of the natural paraffins is a problem which is of a great and absorbing interest and cannot fail to produce interesting and valuable results from a chemical point of view. At the same time the work has so far revealed the difficulties rather than indicated the solution of them. It remains to consider another line of attack, viz., the synthesis of acids of high molecular weight from hydrocarbons of a comparatively low molecular weight. The procedure, however, in this case involves elaborate chemical reactions, such as the chlorination of olefines and the preparation of Grignard reagents, and again the difficulty of controlling the course of reaction has not yet been surmounted.

The Synthesis of Glycerides

Having obtained fatty acids, the problem arises as to their conversion into glycerides or analogous compounds which might be substituted for them. This involves the synthesis of glycerine itself, since the source of our present supply is the natural glycerides. At the present time industry appears to need all the glycerine available from the splitting of natural fats and oils, and consequently the search for other sources is of interest and importance. Of the possibilities in this direction mention must be made of the production of glycerine by the fermentation of sugars. In the ordinary process the yield of glycerine is about 3 per cent. Connstein and Lüdecke state that the yield of glycerine can be increased if fermentation proceeds in the presence of sodium sulphite and certain salts. The sulphite prevents the infection of the reaction mixture; thus with 100 parts of sugar and 40 of sulphite the yield is 23·1 per cent. of the sugar used, but with 200 parts sulphite the yield is 36·1 per cent. Beyond a certain point, however, the sulphite retards the reaction and affects the yeast. Thus by using a solution of 10 litres of water and 1 kilo. of sugar with 400 grammes sodium sulphite, together with ammonium sulphite, sodium phosphate, and potassium salts, the sugar is completely fermented in a few days by 100 grammes of yeast. The process was worked during the war by the Protol Co., and a monthly output of 1,000 tons of glycerine obtained 100 parts of sugar gave 20 parts of pure glycerine, 27 of alcohol, and 3 parts of aldehyde. The yeast is removed by filtration, and the alcohol and aldehyde removed by distillation. The bulk of the salts present are precipitated by calcium chloride, followed by sodium carbonate. The liquid is then neutralised with hydrochloric acid, filtered, and finally concentrated by evaporation, when glycerine is obtained. Traces of trimethylene glycol are also formed. In this connection the work of Taylor and Nelson is of extreme interest. By the hydrolysis of maize starch, which has been suitably treated, these workers obtained compounds from which fatty acids, including palmitic, could be isolated. A further development of the quest for synthetic edible fats is suggested by the work of Lapworth and Pearson, who synthesised compounds of fat and starch, by treating natural glycerides with carbohydrates such as mannitol. These products are apparently digestible, which suggests that it might be possible to remove the glycerine from the natural fats for use in other directions and utilise the fatty acid portion of the molecule in conjunction with other radicals.

It will be seen from the above rapid survey of the synthetic foods that many lines of investigation are available, and that, though the problem is extremely complex, the work so far carried out is rich in suggestiveness. It is not impossible that ultimately the attack upon the constitution of the natural petroleum will evolve a branch of chemistry as fruitful of results and as systematic in its methods as that which has resulted from the study of the coal-tar distillates.

The Natural Resources

Whilst the synthetic processes are of great interest, the possibility of expanding the existing natural resources by scientific cultivation and treatment must not be ignored. How greatly that may affect the position of the synthetic product, even when it has become firmly established, is shown by the case of indigo. Here the synthetic product drove the natural one from the market, but under stress of war circumstances the cultivation of the indigo plant became the subject of intensive scientific study, with the result that the yield and quality were so improved that the natural indigo could successfully hold its own against the competition of the synthetic product. In the case of the seed oils, much has already been done with those which are of the greatest immediate commercial value, such as linseed, cotton seed, and arachis. There are, however, vast quantities of oil-bearing plants from which the oil is still obtained by the crude methods of the natives. In the case of palm oil particularly, much has been done.

Reference must also be made to the work of the French in their African possessions. In addition we have to consider the large number of oils which have so far been only the subject of laboratory experiments, such as cohune, of which there are vast supplies in British Honduras and parts of South America. In many cases these new seeds present difficulties in the matter of shell-thickness and so forth to the seed-crusher, but it has been shown that these can often be overcome by suitable modification of the process to meet individual cases. There is also the possibility of modifying the nature of the fruit and increasing the supplies of oil by suitable cross-breeding and manuring.

A Review of the British Shale Oil Industry

Present Problems and Future Prospects

In the following article the economic and other causes, both internal and external, which have given rise to the difficult situation with which the shale oil industry is now confronted, are closely analysed. As a result of this analysis various courses of action are suggested for strengthening the industry.

THERE are three periods of price-level affecting the shale oil industry. (1) The pre-war period, during which oil prices were high, wages and taxes low, and the Scottish shale fields profitable. (2) The war introduced a period having no parallel since the Industrial Era began. Costs of production rose to unheard-of heights, and prices in some cases followed suit, in others fell abysmally. Some industries prospered, others fell into ruin. (3) The post-war period of the last few years, during which industry has been struggling to accommodate itself to crushing taxation, wages not very much below war-level, and prices for its products have fallen below those ruling before the war. Under these conditions both the shale oil industry and its great ally, the coal industry, have ceased to be profitable.

Existing Economic Conditions

Some say that "they can see no way out of the present trouble." Taxes and wages are more than industry can carry; that the market is "retreating" while costs of production cannot be reduced. "Subsidy"—such say—"is the only way out of this impasse; it is the Government that got us into this mess, and it is for them to extricate us." It cannot be denied that the Government of that day did bring ruin upon our coal industry by their interference, and that their successors have shown their contrition by subsidising the industry at the expense of the docile taxpayer.

But the salvation sought by these pessimists recedes from us as we pursue it. Anyone who ruins an industry is a most unlikely party to know how to resuscitate it, and, as the ill-directed efforts of politicians can only be made at the expense of the nation, our case will get worse the more we are subject to Government interference.

English Shale Fields

The lack of success attending operations in this field is an emphatic confirmation of the importance, always insisted upon by engineers but often overlooked by promoters, of completing the preliminary studies. The school copy-book should contain the line: "Solve your problem before you put up your plant." The cost of technical advice and of experimental installations and trials is as nothing compared with the losses which accrue from the hasty erection of an unsuitable plant, followed by attempts to solve the problem of producing saleable oils at a profit. But it must be added that the economic conditions ruling during the period of attempted operation were particularly adverse, and have caused the closing down of several overseas shale works, so that misfortune may be pleaded.

Scottish Shale Fields

A first glance at the Board of Trade Accountants' Report* discloses four cardinal points:

(1) High capitalisation. (2) High mining costs. (3) Low refining costs. (4) The hidden burden of taxes, rates, and statutory charges. In so far as fresh capital expenditure was incurred from 1914 onwards, such costs must have been from 250 up to 400 per cent. higher than would have been the case had such works been executed before the war. The incubus of high costs of construction are calculable, but are not generally realised. For instance, if a China Clay property, equal in all respects to the best properties now operated in Cornwall, were to be discovered in Great Britain, it would be impossible for any one to utilise it, as the costs of development and equipment are now prohibitive. Every new constructive venture, if it should have to compete with operating concerns constructed before the war, is hopelessly buried beneath high capital charges. The high capitalisation of the Scottish shale oil industry is therefore, in great part, exempt from criticism. But it is true that if an industry does not earn its working costs, the question of capitalisation does not immediately arise.

Mining Costs

In U.S.N.A., where "Glory Hole" methods of truck filling are possible, mining costs have been estimated at 1s. per ton. On the continent of Europe 2s. 6d. to 3s. is an average rate.† In the Scottish shale fields the average cost is 7s. 3d., and the lowest (Oakbank) above 6s. This great disparity may be due to the fact that mining conditions on the Scottish fields are not comparable with those abroad. But it is worthy of note that the losses incurred in the six months under review averaged 1s. 1d. per ton of shale treated, so that if the average cost of mining could be reduced from 7s. 3d. to 5s. 1d. per ton, the losses made on mining would, on paper, be turned into a profit of the same amount.

As things are, at a mining cost of 7s. 3d., a ton of shale is gained containing a recoverable content varying from less than 20 up to a maximum of 24 gallons of crude oil and crude naphtha. This content, at an assessed value of about fourpence per gallon, amounts to about 7s. (to 8s. as a maximum), and we are faced with the fact that the mining costs have already, in advance, eaten up the crude oil value of their product. Starting from such basis as this, no profit can accrue other than what may be theoretically made by refining,

* *Scottish Shale Industry.* Cmd. 2538. 1925.

† Conditions and wages differ so widely that comparison carries little or no meaning.

extraction of sulphate of ammonia, and utilisation of spent shale. This is made clear in the Report, although not made brutally obvious.

Ceteris equalibus, the industry is unprofitable from its start, because the costs allocated to "mining" are 30 per cent. higher than the industry will bear.* In this context there is a close parallel with coal production. The value of the product will not bear the cost of getting it out of the mines and of conveying it to market. The indications are that hours of labour must be lengthened, or wages decreased, or the burden of insurances, welfare charges, costs of traction, and incidental costs of management, etc., must be reduced, and economies must be effected on some or all of these headings. Even if such economies, totalling 30 per cent., can be effected, some of the least payable mines will also have to be closed. There remains over the possibility of using improved methods of mining, as to which no one should express an opinion unless he has examined the operation of each mine under review.

Refining

The industry appears to be exceptionally well-served in the matter of refining. It has expert technicians, modern plant, and capital for all its needs. In the result the products are standardised, and are refined at a cost which will bear comparison with any other refinery of shale oils. The question of retorting presents a number of technical points upon which one cannot reasonably expect information to be made public. Many publications dealing with new systems of retorting have recently seen the shelves of the Patent Office. Some have proved applicable to certain shales, and most of these new methods possess advantages of some kind or other. But every shale demands a class of retort specially designed to meet its own peculiarities of composition. Inasmuch as the Scottish shale industry is the oldest in existence, it is clear that, in its case, the experimental stages should now be passed, and the modifications introduced should have resulted in a system exactly suited to the mineral treated.

Efficiency of Retorting

But whether this is so in fact is by no means clear, for assay-values are not available. Some years since it was said that the Scottish shales then operated gave an average content of theoretically-obtainable oil in the neighbourhood of 25 gallons of dry oils to the ton. But we find that the latest returns from the twelve producing works show that eight of them secured an average of less than 20 gallons of crude oil and crude naphtha per ton, and only four exceeded this rubicon. It may well be that some of the best shales have been worked out, and that lower grade shales have recently been brought into use, but, unless this pauperisation is very marked, the improved methods of modern retorting should have fully kept pace with this loss. The costs set down under the head of "Retorting" are on the low side, but the efficiency of the processes in use has not been demonstrated.

In general it is worthy of note that the processes of sulphate of ammonia extraction, and of refining, both show profits. But it should be borne in mind that this profit is shown by taking over material at cost of production irrespective of its value, and by handing it over on a basis of value less costs. Such profits are approximations even as shown in Ap. IV. of the Board of Trade Report. All the twelve works show losses, but the smallest losses per gallon of crudes were shown at the two works of Young's Company. In both these cases the loss per ton of shale was only about 4½d. No value has been attached to any spent shale.

Taxation

The incubus of taxes, rates, insurances, welfare work, and the accumulated burdens due to uneconomic rates of wages in the sheltered industries resulting in dear fuel, materials, and heavy cost of transport must constitute terrible burdens on this industry among others. Relief from some of these burdens must be found, and the following suggestion seems worthy of consideration. In Victorian days it was calculated that a new plant would continue to be productive until it was more or less worn out.

A certain amount of money could therefore be set aside every year for normal depreciation without incurring liability to income tax thereon. To-day, this condition of relative stability has passed away. A new plant may become obsolescent, as an economic productive unit, at a few months' notice. A fundamentally new process is perfected, and the "new" plant becomes worthless. Under present conditions a very large provision should be made for the establishment of a Re-equipment Fund, and the yearly provision so made should be freed from income tax. Unless something of this sort is done, the position of many productive industries will become increasingly precarious.

Future of the Industry

From the consideration of these facts it will be seen that, even if no changes take place in the industry or in the conditions surrounding it, a reduction of 30 per cent. in the mining costs would result in placing the industry upon a profitable basis. Not, however, in the sense that the balance sheet capital of over £3,000,000 would secure a reasonably remunerative return. But it might enter this category under certain not improbable circumstances. For instance, a market might be found for all the gas and fuel oils produced; the result of the retorting processes might approximate more closely to the theoretically-obtainable content of oil-forming material in the shales; some use may be found for the spent shale; some subsidiary industry may be established; or the price of oil products may rise from their present very low level.

Then again, although these contingencies seem more remote, taxes, rates, and statutory charges, fuel, transport, etc., may be reduced in cost, and without relying upon a State subsidy, this industry may again become profitable. But inasmuch as the age of subsidies and of protected key industries has actually arrived, and as the shale oil industry is not only a fuel industry ranking as such with coal, but is also a key industry of paramount importance in war time, it clearly falls into the category of subsidisable and protectable industries, fit to be maintained at the expense of the taxpayers. The 1s. 6d. per ton distributed average payment now being made to enable an increasing number of colliers to receive their present wages, would, if applied to the shale industry, result in the Scottish shales being able to pay a fair interest on their shares. From an unofficial political source a suggestion has been made that the coal industry should be "taken over" and a guaranteed profit of 1s. 6d. per ton raised paid to the owners. If such a scheme were applied to the shale mined in Scotland the shareholders in the Scottish shales should receive dividends in the neighbourhood of 10 per cent.

Such schemes cannot be mentioned under the head of "Economics," but neither can we banish them from our thoughts. For if the Governments place an unbearable load of taxes and charges upon an industry, and also call upon it to keep its workmen employed at an uneconomic wage, subsidies must be given to enable such costs to be met. The treatment by our Government of the industries recently or still controlled by them—such as the coal industry and the railways—bear, to the economist, the aspect of huge Government jokes. But they have made the patients so very ill that they must now either be doped, or they must undergo crucial operations in the hope of recovery. A. W.

* Board of Trade Report, p. 11, Appendix No. II, shows that a gross loss of £179,550 was made in the last six months' working, whereas the losses during the two previous periods of six months each had only averaged £77,102. There is nothing to show how this additional loss of over £100,000 had been incurred. The failure to sell their gas and fuel oils is limited in these accounts to a loss of £30,000.

Purification of Petroleum Foots Oil

A PAPER, Serial 2724, on "The Disposal of Petroleum Foots Oil," by L. G. Marsh and L. D. Wyant, has been issued by the Bureau of Mines, Washington, D.C. The manufacture of lubricating oils from wax-bearing crude petroleums involves the removal and recovery of the paraffin wax contained in the lubricating distillates. The wax is removed from lubricating distillate by chilling and cold pressing, the product of this operation being "pressed distillate" and "slack wax." Slack wax is a mixture of waxes and oils, containing usually 40 to 60 per cent. of commercial paraffin wax. The slack wax is refined by fractional melting or "sweating," yielding a mixture of "foots oil" and "intermediate wax." The foots oil fraction is usually about half the volume of the slack wax charge. It usually contains 55 to 85 per cent. of oil, the rest

being wax. In refinery practice intermediate wax is usually put back with the new slack wax coming into the sweating plant, and thus recycled through the sweating operations. In refineries where the volume of intermediate wax is large it is often processed through the sweating operations separately, as it yields a special wax with a melting point lower than that of the regular or first-run paraffin.

Methods of recycling foots oil vary widely in different refineries. Until recently refiners usually mixed the foots oil with part of the wax distillate from the crude and then distilled the mixture without using steam. This dry distillation is referred to in refinery parlance as a "cracking" distillation, but the temperature is not high and the distillate is very much like the material charged to the still, apparently being only slightly "cracked." On the whole, it is not to be recommended. Re-distillation with steam would probably not injure the product, but would not increase the wax yield. The best procedure apparently would be to return the foots oil to the presses by mixing it with new wax distillate. For efficient pressing, however, the concentration of wax in the mixture should not be too high. Therefore, only a small amount of the foots oil could be added. In plants where the double pressing method is used, this disadvantage might be overcome by carrying out the first pressing at a slightly increased temperature. If the single pressing method is employed it might be possible to include more gas oil in the wax distillate from the stills so that the wax content of the mixed pressing stock at the pressing temperature would be satisfactory. The most efficient method for any plant would, of course, have to be worked out by experiment.

"A Monumental Report"

To the Editor of THE CHEMICAL AGE.

SIR,—The issue of THE CHEMICAL AGE for January 23, 1926, containing your editorial entitled "A Monumental Report," has just come to our attention.

We wish to correct the erroneous assumption on your part that the plant mentioned in the Fixed Nitrogen Laboratory's report as having adopted their synthetic ammonia process refers to the Mathieson Alkali Works. We acknowledge assistance of the Fixed Nitrogen Laboratory in matters relating to catalysts for ammonia synthesis. It is not true, however, to state that we have adopted their "process," or that our process has been worked out by the Fixed Nitrogen Laboratory. They had nothing whatever to do with the design.

Our present units are the design of our own engineers and consultants and differ materially from the design of the Fixed Nitrogen Laboratory. The commercial installation referred to, made according to their plans and having a capacity of three tons of ammonia per day is located on the Pacific Coast. The present capacity of our own installation is 15 tons of ammonia per day.

We will thank you to have this correction made and remain, yours, etc.,

THE MATHIESON ALKALI WORKS, INC.
R. E. GAGE, Chief Chemical Engineer.

250, Park Avenue, New York.
February 6.

The West-Jaques Process

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to the editorial note on this matter in your issue of the 20th instant, a small scale plant was erected by Bolckow, Vaughan and Co. and ourselves at their Dean and Chapter Colliery, Ferryhill, capable of making about 20 lb. of sulphate per hour. This was tested both with coal and with synthetic ammonia, and on the results of the tests Bolckow, Vaughan and Co. erected a larger unit designed to produce one ton of sulphate per day. The smaller trials indicated that the product from coal ammonia oxidised less readily than that from synthetic ammonia, and it was therefore decided to attempt to purify the ammonia supplied to the larger plant. As the ammoniacal liquor contained only 0·7 per cent. of ammonia, this purification proved to be a matter of difficulty, and it became evident that complete purification, which was never, in fact, attained, would be so expensive as to off-set the financial advantages to be obtained in other directions. But the product obtained without purification, which was snow white, neutral, and non-hygroscopic, appears quite likely to prove a satisfactory fertiliser, possessing advantages over sulphate of ammonia in certain respects, such as sterilisation of the soil, which is now recognised to be of great importance. The sulphite completes its oxidation in the soil rapidly, while the sulphur which splits off from the thiosulphate has also a beneficial action. The advantage to the manufacturer in point of disposal of devil liquor is obvious.

In the course of the trials it was found that considerable quantities of sulphite fume escaped from the reaction vessel. This was foreseen, and space was left for the erection of a filter which had already been designed for the purpose, but this has not been erected pending a decision as to the marketability of the product. In the meantime, the coke ovens to which the plant is attached are shut down. In the case of synthetic ammonia agricultural tests would probably be unnecessary.—We are, etc.,

For JAQUES, MORGAN AND WEST,
A. JAQUES.
J. S. MORGAN.

The Morgan Chemical Co., Ltd.,
6, Fenchurch Buildings, E.C.
February 23.

[We are glad to publish the above letter, and below we give some more detailed particulars about the process. We understand that the Morgan Chemical Co. would be pleased to get in touch with some one who would undertake the completion of the experiments and the agricultural tests, as these cannot at present be carried out at Ferryhill owing to the industrial conditions.—ED. *C.A.*]

The West-Jaques Process for Ammonia Fixation

THIS process has for its object the production of solid ammonia compounds suitable for use as fertilisers without the use of liquid acids. It consists in allowing gaseous ammonia to react with dilute sulphur dioxide, such as weak burner gases, etc., in the presence of water vapour. Under suitable conditions of temperature and concentration, which are easily regulated, the gases interact, throwing down solid ammonium sulphite which is in a state very sensitive to oxidation by the air.

When working with pure ammonia such as synthetic, the sulphite thus obtained can be oxidised readily by simple agitation in the air, yielding a product containing upwards of 70 per cent. of sulphate of ammonia in the course of an hour. This material is white, neutral and non-hygroscopic. The oxidation completes itself by degrees on storage.

With coal ammonia, the impurities, if not removed, retard the oxidation of the product, which consists of a mixture of sulphate, sulphite and thiosulphate with small amounts of organic impurities. The suitability of this material will have to be decided by agricultural tests. This procedure has the advantage that there is no devil liquor to be dealt with, in addition to the large financial saving on account of sulphuric acid plant and manufacture.

The following is an estimate of the working cost using synthetic ammonia based on an output of 100 tons sulphate per day, and taking pyrites at 8d. per unit.

Capital cost, including burner plant, buildings, etc. £55,000.

Daily working cost—

	£	s.	d.
Pyrites, 3,000 units	100	0	0
Steam, 60,000 lb.	6	0	0
Lime, for ammonia recovery, 6 tons	9	0	0
Labour:			
3 foremen £2 5 0			
20 men 8 0 0			
3 chemists 2 5 0			
	12	10	0
Management	2	0	0
Repairs	10	0	0
Depreciation on £55,000 at 10 per cent. per annum, paid by 300 working days	18	6	8
	£157	16	8

Working cost per ton sulphate: £1 11s. 7d.

In making sulphate of ammonia one ton of chamber acid is required for each ton of sulphate. Consequently for the above output 100 tons per day of acid would be required, and the plant for manufacturing this alone would cost at least £100,000. The daily cost of the new process, including depreciation, is much less than the cost of the sulphuric acid alone in the ordinary neutralisation processes. The process is clean, simple, and easily controlled, and there are no liquids to be dealt with.

Metric Measures and Equivalents

A FOLDER containing 30 useful tables of metric measures and their imperial equivalents, and vice versa, has been issued, price 6d., by the Central Translations Institute, Ltd. The tables should be of value to anybody whose interests are scientific, technical, or commercial.

Indian Chemical Notes

(From a Correspondent.)

Experimental work in connection with the fixation of nitrogen in soils has been in progress for some years past. The general conclusion arrived at as a result of these experiments so far is that by means of composting with sulphur, the natural indigenous source of phosphate in the form of bones may be effectively utilised in place of imported superphosphate. It seems probable that at the present price of imported sulphur in India, this method represents an economically possible way of dealing with the vital problem of the phosphatic requirements of Indian soils. The ideal alternative which should be seriously considered would depend upon the elimination of sulphur by making use of organic acids resulting from the bacterial fermentation of suitable organic matter; so far experiment has not found a way to attain by this method the same degree of efficiency as that arrived at by the use of sulphur; the fact remains, however, that in the fermentation of maize silage a pH of 3·8 can be attained which would allow of a considerable degree of solubilisation of certain phosphatic compounds. The economic difficulty arises from the fact that in general the raw material containing sufficient sugar-yielding carbohydrates to produce effective quantities of lactic and other organic acids by bacterial fermentation is too valuable as a foodstuff to be made use of as a source of manure. The problem, then, is similar to that connected with the production of industrial alcohol, namely, the provision of a sufficiently cheap carbohydrate material and one the use of which does not involve the diversion of the food supply into other channels.

Tobacco Industry

The problem with which the cigarette-making industry in India is at present confronted is to obtain a type of tobacco which will resemble the American tobaccos in flavour, colour, and smoking qualities, while possessing the hardiness and growing qualities of the best Indian varieties. Two types of American tobacco—Adcock, the best of the cigarette tobacco, and Burley, which forms the basis of some of the finest pipe tobaccos, were selected for hybridisation with the Pusa type 28. During the past year all these types were grown in the Botanical Area with the object of obtaining pure line seed and of making a comparative study of the morphological characters of the three types. Some crosses were also made, and the first generation hybrids from these crosses are being grown during the coming season.

Experiments were also made in different methods of curing the leaf, as this side of the industry is at least as important in the final result as the production of improved races of the crop. Very good results were obtained in the curing of Burley by air-curing on racks, both with the split stem method and by stringing the leaves, the finished product in this case being scarcely inferior in colour and flavour to the product of the tobacco-growing States of America.

Lac Cultivation

Observation on the lac insect and its parasites have been continued, particular attention being paid to the seasonal appearance of, and extent of parasitisation by, *Eublemma amabilis*. Attempts were made to get a parthenogenetic brood of the lac insect. The value of lac cultivation is being appreciated, and numerous inquiries were received from different parts of India during the year. Demands for the supply of brood lac could not be met for want of sufficient number of trees for lac cultivation at Pusa. It is expected that the Indian lac Association for Research will soon take up the work of maintaining a good supply of brood lac for distribution. If, however, the work is to remain with the Agricultural Research Institute, it is necessary to start a plantation in some suitable locality and undertake lac cultivation on a larger scale than has been done so far.

Paper Pulp Industry

A recent investigation at Dehra-Dun of bamboos from the Angul forests in Behar has resulted in a successful process for manufacturing pulp, and the prospects of a factory at Cuttack seem to be good. The Government of Behar has notified its willingness to give State aid to private enterprise desiring to take advantage of the opportunity.

S.G.W.

Gas Works By-Products

South Metropolitan Gas Company's Meeting

Dr. Charles Carpenter, president, was in the chair at the ordinary general meeting of the South Metropolitan Gas Co. on Wednesday in London. After outlining the advantages of gas, he said that whatever might be the needs of the domestic consumer in the matter of smokeless fuel, it was certain that for manufacturing purposes low temperature fuel afforded no advantages over ordinary retort or oven coke.

He then referred to tar and ammonia. The value of tar depended mainly upon two factors—its use for road-making and in the form of pitch for patent fuel production. Regarding the latter, they had always exercised the greatest care to keep up and improve the quality, which could very easily be damaged by imperfectly understood carbonising processes. As a result their product stood high to-day in the estimation of their buyers. The problem of tar for road use was a much more complex one, as they had now to compete with imported bitumen, which had certain characteristics of its own. These had shown the need of more scientific methods in the preparation of road tar, and he thought that in the long run it would mean that tar produced in the smaller gas works would be handled by those larger undertakings who alone had the plant and staff needed for the purpose. Despite a dull market, the special make of sulphate of ammonia found a ready sale both at home and abroad. There again quality told, and to-day standards made it difficult, if not impossible, for any but the best-equipped organisations to produce a material acceptable at its true value overseas in competition with the synthetic product. Prices were down, but this had been counteracted by economies in working which reflected great credit upon the staff. In like terms he would refer to those officials who were engaged in extending the industrial uses of gas as well as of by-products, and whose services were freely placed at the disposal of actual or possible customers. For to-day they found that in addition to producing and selling staffs they had need of an advisory branch, as well as one engaged in research.

In conjunction with one of the best known chemical firms on the continent they bought from the Government for a large sum a chemical works adapted for the manufacture of those finer tar products of which Germany had the monopoly before the war. It was not foreseen that most nations would set to work to provide their own requirements, but that was what happened, and this experience had been shared by many others.

Action by Lawes Chemical Manure Co.

In the Court of Session on Tuesday, February 16, Lord Moncrieff pronounced judgment in an action by the Lawes Chemical Manure Co., Ltd., 59, Mark Lane, London, against (1) John Joseph Cridlan, Maisemore Park, Gloucester, and others, the trustees of the late William Scott Ferguson, Pictstonhill, Perth; (2) W. S. Ferguson and Co., Ltd., manure manufacturers, Perth; (3) James Simpson, grain merchant, sometime of City Mills, Perth, and others, the directors of W. S. Ferguson and Co.; and (4) the shareholders of the company as at August 1, 1922. The pursuers concluded for decree of reduction of a minute of agreement, dated August 1, 1922, by which in consideration of the payment of £12,500 the pursuers acquired the business of W. S. Ferguson and Co., Ltd., together with the heritable subjects occupied by the company in connection with their business.

Lord Moncrieff dismissed the action and found the defenders entitled to expenses.

Physical Society

The Society met on Friday, at the Imperial College of Science, when the following papers were read: "The Effects of Torsion on the Thermal and Electrical Conductivities of Aluminium, with special reference to Single Crystals," by J. E. Calthrop, M.A., M.Sc.; "A Study of Concurrent Variations in the Thermionic and Photo-Electric Emission from Platinum and Tungsten with the State of the Surfaces of Those Metals," by T. H. Harrison, B.Sc. Demonstrations of some phenomena of surface tension were given by Mr. E. Edser and Mr. C. R. Darling, F.I.C.

The British Industries Fair

Chemical Exhibitors Well Satisfied with Results

THE British Industries Fair, 1926, which closed on Friday, at London and Birmingham, attracted trade buyers from over 40 different countries, and it was estimated at the end of the first week that goods then ordered in the London section alone were well in excess of £1,000,000, and many new accounts have been opened both at home and abroad. Attendances have exceeded all expectations, and at the London section the first week's figures were 23,000 against 10,000 in the same period of 1924. The experiment, so far as the White City is concerned, of admitting the public in the evenings, proved successful and 20,000 people paid for admittance in the first few days. The Fair at both centres has been greatly assisted by the active interest of the Royal Family; the King and Queen, the Prince of Wales, and the Duke of York all visited the Fair and their presence was most gratifying alike to exhibitors and to the administration.

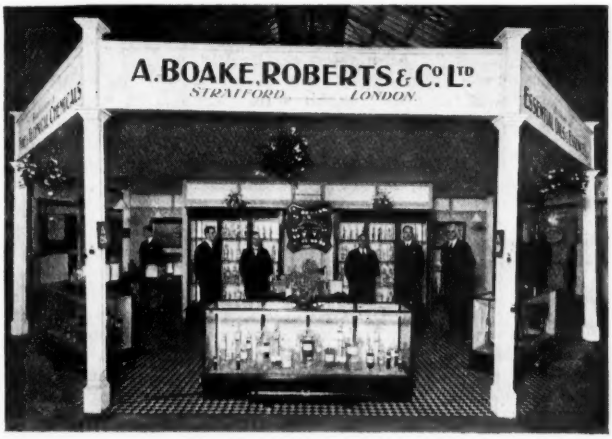
Chemical Exhibitors' Views

With the intention of testing the actual experiences of the exhibitors in the chemical section at the White City a representative of THE CHEMICAL AGE inquired of the principal standholders this week.

Some of the firms qualified their remarks by stating at once that direct business or definite orders of considerable dimensions were not anticipated. They were exhibiting rather with the expectation of arousing interest and demonstrating their products and with the idea of meeting inquiries. These

firms and others who reported good business, were very well satisfied with results and inquiries received. With hardly an exception, exhibitors compare this Fair more than favourably with past Fairs. Buyers have been more numerous, particularly from Japan and the East, and representatives from countries that bought almost entirely from Germany before the war have shown marked interest in British chemicals. All standholders regarded the Fair as a welcome opportunity for meeting old customers, and several remarked upon the advantages offered of contact with other firms.

The Malehurst Barytes Co., Ltd., considered results to b most satisfactory and excellent in every way. They had had valuable inquiries from Japan and Northern Europe. British Drug Houses, Ltd., had numerous foreign inquiries an consistent interest was shown in the capillator for the determination of hydrogen ion calculations, and in their soil testing sets which are a recent feature. Howards and Sons, Ltd., report satisfactory results with particular inquiry for their Cyclohexanol group of solvents and for thymol and synthetic menthol which was first manufactured and placed on the world's market by the company. W. J. Bush and Co. expressed satisfaction with the results and mentioned that the King, who spent several minutes at their stand, was particularly interested in their Vanillin exhibit and in its production from cloves. During this time the Queen had passed down the avenue and displayed much interest, particularly in the highly coloured chemicals and in the camphor bells on the stand of Whiffen and Sons. This firm consider results will exceed those of the last Fair, and several inquiries are expected to lead to important business. Their new size in prunella balls was very well received.



Prospects of Trade with Poland

Burgoyne, Burbidges and Co., Ltd., reported good inquiries and particularly from parts of the country not touched before. Foreign buyers also were attracted by their exhibit of chloral hydrate, chloramin T., cantharidin, and butyl chlorate hydrate of exceptional whiteness. This firm was favoured with a visit from the representative in London of the Polish Government, who stated that Poland was particularly anxious to develop trade with Britain and in the chemical industry there appeared to be great possibilities. The firm found much inquiry for their organic fine chemicals and for reagents. Boots Pure Drug Co. stated that during the Fair they received numerous unsolicited tributes to the reliability of their products. Inquiries were good. Inquiries at the Viscose Development Co. exceeded all expectations, and the fact that the patent capping process was entirely British and that only British materials were used was found to influence new clients and to bring British customers back. Williams (Hounslow), Ltd., had inquiries and visits from buyers from East and South Africa, Canada, Shanghai, and Persia, and their lake colours and harmless foodstuff colours were favourably commented upon and inquired after. Thomas Tyrer and Co., Ltd., considered results to exceed those of previous British Industries Fairs. More home and foreign inquiries were received and their bismuth products and citrates received marked attention. While looking upon the Fair chiefly as a means of advertising and for educational purposes and propaganda, Boake, Roberts

and Co. are very well satisfied with this year's efforts and much inquiry has been entertained. At Stand A1, whose holders have set out to give service to any inquirers, the Chemical Engineering and Chemical Catalogue, 1926 edition, is displayed. If only for the abridged catalogues of over 100 manufacturers of chemicals and chemical plant this production would be most useful, but the text includes numerous informative articles, one on the corrosion of metals by Sir Robert Hadfield. Relative tables and conversion factors are also printed and inquiries and sales has been very satisfactory.

Admission of the Public

The general opinion of the chemical section as to the admission of the public each evening was that it was a satisfactory innovation. While the majority of the public found little of interest in the section and passed on, it was recorded that definite and promising inquiries were received from several sources not coming under the trade buyer's category. On the other hand, there were complaints in some cases that the public interfered with exposed samples and necessitated constant attention, sometimes disarranging exhibits, but on the whole the move was welcomed.

An Annual Fair

At a meeting of the British Industries Fair Exhibits Advisory Committee (representing the exhibitors at the London section of the Fair), held at the White City, London, on Tuesday, a resolution was unanimously passed in favour of continuing the Fair next year, and placing it on a permanent basis.

Reports from the various sections on the results of the present Fair were very encouraging, and representatives of all sections on the Committee anticipated that larger numbers of exhibitors would participate next year.

Unexplained Death of Dyeworker

THE adjourned inquiry into the cause of the death of James Lee (41), Grouse Street, Rochdale, employed by Jepson, Ashworth, and Edmunds, Kid-glove Dyeworks, Middleton, was held on Wednesday, at the Manchester City Coroner's Court. At the previous hearing evidence was given to the effect that the firm had used a substance known as Brenthol H, and it was suggested that fumes arising from the mixture had affected Lee, who died on February 7.

Arthur William Waller, works manager at the British Synthetic, Ltd., stated that his firm had supplied Brenthol H to a Manchester chemical company, who, in turn, delivered it to the firm at which Lee worked. No serious complaints had ever been received regarding any ill-effects on workmen employed. The substance was dissolved in caustic soda, and cloth was passed through it. The solution in use in a dyeworks was from 100 to 1,000 times weaker than the compound.

Replying to H.M. Inspector of Factories, the witness stated that only a slight vapour was given off when Brenthol H was used.

Dr. Fergus R. Ferguson stated that he found that death was due to toxic jaundice. In reply to the Coroner, the witness said that he could find no records indicating death in similar form to that which had overtaken Lee arising out of contact with chemical substances. He did not think that Lee's illness could have been caused by contact with these chemicals.

The Coroner returned an open verdict.

Colour and Constitution

DR. H. H. HODGSON, of the Huddersfield Technical College, lectured before the West Riding Section of the Society of Dyers and Colourists at Bradford last week on "Colour and Constitution." Mr. H. Jennings (president) occupied the chair.

In the near future, said Dr. Hodgson, a complete mathematical description of molecular structure might be anticipated, but at present definite systematic exploration from the experiment side had to suffice. The data now obtained enabled certain generalisations to be attempted, but, broadly speaking, work was still in the empirical stage.

Pointing out that the Huddersfield Technical College was making a direct effort to aid the dyestuffs industry, Dr. Hodgson said that students at that institution were being trained in research methods along lines of pronounced utility, while in no way sacrificing the scientific idealism which should actuate the development of all scientific work.

Low Temperature Carbonisation

The Lines of Future Development

AT a meeting of the Institution of Mining Engineers (Midland Counties Institution Section), on February 17, at University College, Nottingham, Mr. David Brownlie, a well-known authority on the subject, read a paper on "Low Temperature Carbonisation: A Consideration of Different Processes Operated in Direct Conjunction with Steam Boiler, General Furnace, and Power Plant, especially in Relation to the Utilisation of Low Grade Colliery Fuels."

The author said that the next stage of evolution in steam power station operation was the combination of low temperature carbonisation of raw coal with separation of the tar or crude oils and, if necessary, ammonia, and the combustion under the steam boilers of the residual gas, along with the smokeless low temperature fuel. It was impossible to go on burning 8,000,000 tons of raw coal per annum under the power station boilers of Great Britain.

A Great Saving

If carbonisation as part of the boiler plant operation was adopted, this would give every year about 20,000,000 gallons of motor spirit, 120,000,000 gallons of low temperature tar, and 53,000 tons of sulphate of ammonia, while requiring 9,600,000 tons of coal instead of 8,000,000 tons for the same steam output. By a small step the coal now being burned in large quantities in super-power stations and industrial furnaces could be carbonised; over 100 processes were available. Often smokeless fuel and by-products could be sold to much better advantage than raw coal.

The author surveyed comprehensively the following aspects of the subject: (1) The pre-drying of raw fuels before combustion, carbonisation or gasification; (2) low temperature carbonisation in conjunction with mechanical fixed furnaces; (3) low temperature carbonisation in conjunction with pulverised fuel firing; (4) the "Midland Coal Products" process (Nottingham); (5) "Staveley Coal and Iron" or "Markham" processes (Staveley, near Chesterfield). A number of processes were described, some of the information being hitherto unpublished. In the Julius Pintsch process of Berlin, the coal was carbonised at 1,000–1,250° F. for about six hours, by means of furnace gas, the yield per ton being 16–20 gallons of low temperature tar, 40,000 cubic feet of gas (110 B.Th.U. per cubic foot), and 70 per cent. of smokeless fuel. In the "Wisner" or "Carbocite Dual Carbonisation" process the crushed coal was first "thermodised" in a rotary externally heated retort at about 500–600° F., while heated air was passed through the charge. The coal was then carbonised at not above 900° F. The coking power of the coal was not affected by the air treatment. The history of the carbonisation of pulverised coal showed that the pioneer in this field was T. R. Crampton, of London, who took out a patent on the subject, No. 2262/1872.

Recent Results

A plant was being erected at Milwaukee to work the "McEwen-Runge" process, in which pulverised coal was dropped down two externally heated vertical retorts in series, each of which gave a carbonisation of 35 seconds. In the first the temperature was 600° F., and in the second 1,050° F. The volatile content of the coal was reduced to about 10 per cent. The yield per ton was 18–20 gallons tar, 2 gallons motor spirit, and 7,000–7,800 cubic ft. of gas. The Midland Coal Products Co., Ltd., of Nottingham, in association with the Butterley Co., Ltd., of Derby, dealt with the utilisation of small non-coking slacks, and the Staveley Coal and Iron Co., Ltd., with cannelloid colliery refuse such as "bats" "jacks," "black shale," etc. Experiments were being carried out for using the exhaust of a 7,150 H.P. gas engine, operating on blast-furnace gas, for carbonisation.

German Credit for Russian Oil Industry

IT is now officially announced in Berlin that a sale credit of 30,000,000 marks (£1,500,000) has been granted to the Soviet Government by the firms of Otto Wolff, Cologne, and Alfred Wirth, Erkelenz. It will be employed largely for the purchase of boring machinery, pipes, and other plant for the development of the petroleum industry in Russia, and will have a duration of four years.

Professor Armstrong Lashes Out

"Chemists a Disunited Rabble"

A MEETING of the Manchester and District Section of the Institute of Chemistry was held at the Textile Institute on Monday, February 22, when Professor H. E. Armstrong gave an address entitled "The Nescience of Science and the Conceit of Ignorance" to a very large audience. Dr. H. Levinstein presided.

Chemistry on its Trial

Professor Armstrong said that science, chemistry especially, was on its trial in the schools and before the bar of public opinion. To-day, we seemed to have reached a dead level of intellectual mediocrity and sterility. Chemists were a disunited rabble, they had no united voice—no voice of any kind—no public sense, and no sense of statesmanship. The chemist was made use of as a drone to serve commercial ends, but he did not rank in society and his opinion was rarely invited. He was being brushed aside by pseudo-scientific medical opinion, and by the physicist, who was fast raising the gentle art of advertising through scientific achievement to consummate perfection. Chemists had developed no gifts of leadership, nay, worse, no sense of the need of leadership. Selfish jealousy, extreme narrowness of outlook, prevailed everywhere at a time when concerted action and breadth of understanding were imperative needs.

Chemistry was the great vital science which held the key to the mysteries of life, which ministered both to human well-being and to human suffering, which commanded agriculture, and which dominated industry. Were chemists never to rate themselves at their proper worth and to realise their own value? The publications of the societies were fast falling to the abstracts level; the chemist must perforce make himself a walking technical dictionary; he displayed no culture, and was doing all he could to contribute to his own literary downfall. Chemists formerly were close students of their literature and gave some attention to the presentation of their subject. No cloud of mere abstracts would cover the ark of the covenant of chemistry. A tabernacle must be built worthy to rank with that so graphically described by the Hebrew chroniclers—as in it the wonders of the universe would be disclosed and worshipped.

Ignored by the Government

Trade unions were hateful things from most points of view; particularly because they involved the greatest narrowness of the greatest number. Still, if chemists were to meet trade unionism they must join in the scramble. They must become united, and without any further loss of time, in order that they might serve the State and thereby serve their own private interests. Consider what had happened recently! A Coal Commission had been appointed by the Government without a single scientific member, without a single scientific assessor. Not one word either of advice or of protest had been uttered, he believed, by any one of the bodies supposed to be representative of chemical opinion. To take another case, the problems of food were problems of the higher chemistry—of which the medical profession knew nothing. Yet the Minister of Health had laid down rules without even taking considered chemical opinion, on the advice of a Departmental Committee meeting privately, which had never submitted the evidence it heard, and which committee was mainly composed of men known to be idealists. Again, no word had been said by any one of the bodies which should be representative of chemical opinion, no word of support had been given to people like Sir William Pope and others, who had urged that full and proper scientific inquiry should be instituted into the whole problem of food conservation before action be enforced which might have the most far-reaching consequences. We were doing nothing to control the inroads of the ever-growing pseudo-scientific bureaucracy upon our liberties.

Next month, fifty years would have elapsed since he became secretary of the Chemical Society and a clear sixty years since he began to study chemistry. The period had been a wonderful one, but were we wiser than we were? Had we grown more careful in our habit of thought? Was our method being developed into an ever sharper and sharper judicial weapon? Were we developing a logic? We were not. As a consequence, the teaching of science, so-called, was a dead failure as mental discipline.

Present Education a Failure

The opinion was fast growing among all honest people who could judge the situation that the entire present system of education was, in a large measure, a failure. Herbert Spencer, Huxley, and others, long years ago, all urged that science should be put on a par with the other principal subjects in schools because of its cultural value. Universities had been established everywhere in response to the appeals of such men, in which science teaching had been given a prominent place, and the opportunities afforded in schools had been many. The result was most disappointing. Almost everywhere, the teaching was entirely professional in character; boys and girls were taught chemistry at school as though they were to be technical chemists, and the teaching given in the universities was all directed to professional ends.

Examinations had now rendered education impossible. The teacher just boxed with the examiner, and coaching was organised on the principle of the provision store. When, where, and how was the vicious circle to be broken? The beginning must be made at Oxford and Cambridge; their mode of attracting students, their mode of teaching, must be considered, amended, and made suitable primarily for the development of scientific spirit and breadth of outlook.

Early Days in the Dyeing Trade

When Natural Colours Predominated

AT a meeting of the Manchester section of the Society of Dyers and Colourists, held on Friday, February 19, Mr. E. Hickson, president, was in the chair, and a paper on "Reminiscences of the Dyeing Trade, 1869–1925," was read by Mr. W. H. Pennington, F.C.S.

Mr. Pennington said that the advance of knowledge of the tinctorial arts was now so rapid that those actively engaged in its infinite and intricate variety had little time to look at the past, and even got into the habit of neglecting it. While that could be expected, it was none the less detrimental, as it tended to a forgetfulness of the debt which the modern art of dyeing owed to the early dyers.

The Colour Index of the Society now gave details of over 1,300 dyes, all direct derivatives of coal tar. Had such a book existed in 1869 it would have given about 33 dyes, and of these very many were merely laboratory productions. Probably not more than a dozen coal tar colours then found actual employment.

Mr. Pennington stated that he became associated with the industry in 1869, in the early days of aniline colours. Perkin's Mauve was in use, and of the coal tar colours, Hofmann's Violet, Spirit Blue, Magenta, Bismarck Brown, and Manchester Yellow were the only ones he could remember. Fully 90 per cent. of the colouring matters used were the natural and mineral colours such as indigo, logwood, peachwood, barwood, cutch, gambier, fustic, sumac, madder, cochineal, annatto, etc., and iron buff, manganese bronze, Prussian blue, and the chrome colours—orange, yellow, and green. No direct colours existed, and there were no sulphur colours and no vat dyes other than indigo. Alizarine had only just been introduced, and he well remembered the first commercial samples being sent out. The only aniline blue was the Spirit Blue, a phenylated compound of Rosaniline which had to be dissolved in methylated spirits before it was available for the dyer's use. The brilliant derivatives of phthalein were unknown. No azo colour existed. Kekulé had only recently propounded his benzene theory, and the relationship between magenta and triphenylmethane had not been demonstrated. Caro at that time was following up the work of Baeyer in the condensation products of phenol and phthalic anhydride which enabled him later to produce those brilliant colouring matters, the bromo derivatives of fluorescein. Methylene Blue did not appear until 7 years later, and the first sulphur colour, Cachou de Laval, not until 4 years later, and 15 years passed before the first direct colouring matter, Congo Red, was introduced.

After giving numerous details of the practical applications of the dyes available during the period covered, with particular reference to the difficulty of introducing Primulene to dyers who were still smarting from their experience of direct reds, Mr. Pennington mentioned some personal incidents in connection with matching dyes.

British Chemical Glass

Gratifying Progress Since the War

PROFESSOR W. E. S. TURNER, Department of Glass Technology, Sheffield University, writing to *The Times* in reference to recent tributes to the high quality of British optical glass, states that there is a second branch of glass manufacture, namely, that of chemical glassware, which has shown great development in this country since the outbreak of the war and has reached a general level of quality unsurpassed by any other country.

"This industry," Professor Turner states, "which owes its inception to Sir Herbert Jackson and the hearty co-operation of several glass manufacturers in 1914 and 1915, has four factories engaged in the manufacture of flasks and beakers and several others producing glass tubing and miscellaneous scientific glassware. My Department has maintained very close touch with this industry from 1915 to the present day, and has systematically tested the many varieties of flasks and beakers (some 30 different brands to date) which have been manufactured in this country, in America, and in the various countries of Europe; and I have come definitely to the conclusion that for range of compositions available, for resistance to the attack of chemical reagents, and for general all-round excellence there is no country in the world which surpasses or even equals our own at the present time in its types of glass beakers and flasks. During the war, four glass factories in this country produced chemical glassware in the form of beakers, flasks, and other articles. Two of them in post-war times ceased manufacturing these lines, but two other factories, of high standing, have taken their places. Neither the older nor the newer firms have been content to continue to manufacture the same glass as that with which they started. From my own knowledge, they have carried on investigations themselves and have been ready to make use of our own researches and those of others, and they have modified their glass compositions in the light of the latest information available. The consequence is that despite strenuous attempts on the part of Continental manufacturers, my inquiries of scientific colleagues and dealers have shown that British chemical glassware is in use in many of the important laboratories of the country solely on the ground of quality."

Sir Alfred Mond, writing to *The Times* this week in support of Professor Turner's views, states: "British laboratory glass ware and porcelain are exclusively used in the laboratories of Brunner, Mond and Co., Ltd., and I am assured by their chief chemist, Dr. F. A. Freeth, F.R.S., that the supplies are not only entirely satisfactory, but are superior to those from any foreign source."

The Chemistry of Nature

Professor Jocelyn Thorpe at Birmingham

LECTURING at the Birmingham and Midland Institute last week on "The Chemistry of Nature," Professor Jocelyn Thorpe, of the Imperial College of Science, said that we were, through a knowledge of the chemistry of carbon, gradually approaching an understanding of the chemistry of nature and of natural processes upon which the whole edifice of biochemistry must depend. So far as concerned the mechanism of natural processes, we were still much in ignorance. Nevertheless, there was an intermediate stage which was represented by the action of the enzyme, so that the series was life, enzyme, and chemical product. They knew that the enzymes were non-living matter, and it was probable that progress would be made when the structures of these substances and their mode of action had been ascertained, even though the vastly more difficult question of the meaning of life might still remain unanswered.

Our ignorance of the simplest natural process was illustrated by the fact that we did not know how the decomposition of glucose into carbon dioxide and alcohol occurred during fermentation. On the other hand, great progress had been made in determining the structures of products formed during the operation of natural processes. To-day there was a wealth of shades of every hue from which to choose, many of them excelling those of nature. Within recent years the colouring principles of the flowers had revealed their structures, and it was of interest to note that the economical methods characteristic of natural processes had led to the utilisation of practically the same structure for producing the variety of shades found among coloured flowers. The structure of the natural dyeing material, indigo, was discovered by V. Baeyer forty years ago. The industry had led not only to the production of synthetic indigo to supplant the natural product, but the determination of structure revealed the secret on which the valuable properties of indigo depended. While organic chemistry had not yet succeeded in discovering the mechanism of the processes underlying Nature's work, yet they had been able to apply their theory of structure in order to ascertain the formulæ of the materials formed as the outcome of natural processes, and had, in many cases, been able to prepare them by their own methods.

The Refining of Cane Sugar

Growing Competition from Beet

UNDER the auspices of the Liverpool section of the Society of Chemical Industry, Dr. A. C. Cumming, managing director of MacFie and Sons, sugar refiners of Liverpool, delivered a lecture on Friday, February 19, on "Cane sugar refining." Professor W. H. Roberts presided.

Dr. Cumming said that sugar cane was still the most important source of sugar, though beet sugar was helped by bounties or preferential duties, while cane sugar usually was not. The refining of cane sugar was, therefore, still one of the most important industries of the world. There had been a long struggle between cane and beet and it had appeared at one time that beet was destined to vanquish cane entirely. The beet industry, throughout its history, had been a favourite with Governments. An immense amount of money and some of the finest brains in Europe helped to perfect the beet-sugar industry. In 1840 one kilo of sugar was obtained from 17½ kilos of beet and in 1902 one kilo from seven kilos.

While the beet sugar industry was employing scientists of all sorts to find improvements in every branch of the industry, the cane planters did almost nothing and the cane sugar industry was far from flourishing when the war began. Britain then depended mainly on beet sugar from Europe and for a time there was a serious shortage, which greatly stimulated the cultivation of the cane. The Continental beet sugar industry was now recovering and the struggle was again in sight. The cane plantations were better equipped than before the war and scientific control had effected many improvements, while on the other hand few countries could now afford bounties for beet sugar. Given a fair field and no favours, the cane was the cheaper source of sugar and was only losing because the beet sugar industry was run on more scientific lines than the cane industry.

The home-grown beet industry was definitely started in this country. About 40,000 tons of sugar were produced this season and 100,000 tons were expected next year. There was a subsidy on sugar from home-grown beet of over double the market value of the sugar, that is, £200 on every £100 worth of sugar produced. Under these conditions the new industry was prospering, but its prospects if and when subsidies ceased were not very bright. The two stages in the preparation of sugar from the cane were production of raw sugar and refining. The object of the refining was to remove the insoluble impurities, to separate as much as possible of the pure sucrose in an attractive and saleable form, and to make the remainder of the sugar, mixed with the soluble impurities, into golden syrup and treacle.

In 1801 there were 180 refineries in Britain producing altogether 160,000 tons. Last year the consumption in Britain was 1,663,000 tons, of which the eight British refiners supplied 877,000 tons. Modern refineries used bone charcoal to remove colour, but specially-prepared vegetable charcoal was also coming into use. British refined sugar had the highest reputation in the world for purity and quality, but refiners here had not only to meet the competition of foreign sugar but also that of home-grown beet and colonial sugar, both of which were subsidised by the British Government.

A hearty vote of thanks was accorded Dr. Cumming, on the proposition of the Chairman.

British Drug Houses, Ltd.

A New Issue

LAST week, in our "Company News," we announced the forthcoming issue by British Drug Houses, Ltd., of 255,500 ordinary shares of £1 at par. The prospectus is now available.

The company has recently been converted from a private into a public company, and the capital now consists of 242,000 5 per cent. cumulative preference shares of £1 each, and 400,000 ordinary shares of £1 each. The whole of the preference shares and 144,500 of ordinary shares have been issued and are held by the directors and their friends. The balance of 255,500 ordinary shares comprising the present issue, rank *pari passu* in all respects with the issued ordinary shares and will be entitled to rank for dividend as from January 1, 1926, in respect of the full nominal amount thereof.

The company, known throughout the trade as the "B.D.H.," was formed in 1908 for the purpose of amalgamating the following old-established London firms of manufacturing chemists and wholesale druggists :—Barron, Harveys and Co., founded in 1750; Hodgkinsons, Clarke and Ward, founded in 1762; Hearon, Squire and Francis, founded in 1714; and Davy, Hill and Co.—comprising A. S. Hill and Son, founded in 1755, and Davy Yates and Co., founded in 1760.—In 1919 the businesses of John Wyman and of George Curling, Wyman and Co., founded in 1798, were acquired in order to extend the export trade of the company. The customers who have regular accounts are now upwards of 10,000. Six of the present directors were partners in the amalgamated houses, and all the directors have entered into service agreements which will secure continuity of management and control.

The staff of over 1,200 employees, includes upwards of 30 trained chemists—Fellows and Associates of the Institute of Chemistry, and University graduates—between 30 and 40 qualified pharmacists, and a large works constructional and maintenance staff. The company's principal works at Graham Street, City Road, on the Regent's Canal, were completed in 1909 and equipped on the most modern lines. These works have been maintained in a state of complete efficiency, and additions and extensions have been made from time to time which have more than doubled their original capacity. Other properties include premises at Bunhill Row, E.C. (for South American trade); at Islington Green (storage of crude drugs); at Nottingham (as a Midland distributing depot); while the fine chemical works at Wharf Road, adjacent to the Graham Street works, now equals in area the original buildings at Graham Street.

Fine Chemical Developments

Up to 1914 the main business of the company was that of wholesale chemists and druggists, but while business on these lines has continued and expanded, the war, involving the cutting off of German supplies of fine chemicals, afforded the company an opening to develop fine chemical manufacture—an opportunity of which full advantage has been taken. The B.D.H. chemicals for scientific purposes are in use by leading professional chemists and microscopists, as well as by the universities and other research and teaching institutions.

The directors of British Drug Houses are :—Mr. C. A. Hill, chairman and managing director; Messrs. R. R. Bennett, B.Sc. F.I.C., F. H. Carr, F.I.C., A. Francis, Colonel R. K. Harvey, and Messrs. R. M. Harvey, F. C. O. Shaw, and K. G. Shaw.

Optical Convention of 1926

AN Optical Convention will be held from April 12 to April 17, inclusive, at the Imperial College of Science and Technology, South Kensington, London, under the presidency of the Astronomer Royal, Sir Frank Dyson. There will be meetings for the reading and discussion of a large number of scientific and technical papers of an optical character; special lectures and demonstrations, including some of a popular nature; and an exhibition. The commercial and industrial section will be confined to British manufacturers, and will include all kinds of optical apparatus. A special entertainments section is also being arranged. Further information may be obtained from the offices of the Convention, 1, Lowther Gardens, Exhibition Road, London, S.W.7.

Chemical Matters in Parliament

Explosion at Faversham Factory

Sir W. Joynson-Hicks (House of Commons, February 18), in reply to Lord Cavendish-Bentinck, said that he was satisfied that all proper precautions were taken by Curtiss and Harvey at their gunpowder factory, Faversham. There was no reason to think that Home Office regulations were inadequate. The accident occurred in the corning house, perhaps the most dangerous process in gunpowder manufacture. This house had been running since the Act of 1875 without a mishap. The total number of accidents in corning houses throughout the country during the last 26 years had been nine only. The question whether anything further could be done was receiving the attention of his Department.

Poison Gas in China

Sir L. Worthington-Evans (House of Commons, February 22), in reply to Major Sir Granville Wheeler, said that the German Government denied that any German chemists were in the employment of Chinese militarists. He accepted that denial unreservedly.

Poisoning from Gas Supply

Sir B. Chadwick (House of Commons, February 23), in reply to Mr. Scurr, said that there were 27 deaths from gas poisoning in the areas supplied by the three London gas companies. He was aware that the use of water gas in towns' gas increased the proportion of carbon monoxide and the Government was watching the position carefully. A further inquiry would serve no useful purpose.

Foreign Chalks and Crayons

Mr. Samuel (House of Commons, February 23), in reply to Mr. Mackinder, said that the importation of foreign chalks and crayons was prohibited under the Dyestuffs (Import Regulation) Act only if they were of synthetic organic origin. A large variety was available from British sources, and there was no reason for any departure from the practice usually followed in the administration of the Act.

Artificial Silk Trade

Mr. Samuel (House of Commons, February 22), in reply to Mr. Thomson, gave the following figures for before and after the imposition of the Safeguarding duties :—

	Jan.-June, 1925. £	July-Dec., 1925. £
Total Imports	5,357,598	1,589,501
Re-exports	439,738	265,053
Net Imports Retained	4,917,860	1,324,448
Exports of United Kingdom Production	2,618,394	2,794,049

Mineral Prospecting in Great Britain

Colonel Lane Fox (House of Commons, February 23) said that there was no official prospecting for minerals in this country and the Government had no power to facilitate the efforts of private prospectors.

Death of Professor H. M. Onnes

PROFESSOR HEIKE KAMERLINGH ONNES, aged 72, died at Leyden on Sunday. He was Emeritus Professor and Director of the Physical Laboratory at Leyden University and a Nobel prizewinner in physics. He received the Rumford medal from the Royal Society and was an honorary member of the Chemical Society. In the early eighties he studied refrigeration and for many years he worked on the behaviour of metals at low temperatures, and some time before the great war he succeeded in liquefying helium at a temperature of 268·5° C. below the freezing point of water. During his experiments Onnes discovered that at a temperature about that of liquid helium the resistance offered by certain metals to the passage of an electric current apparently disappeared. He wound a very fine lead wire on to a bobbin. At an ordinary temperature it offered a resistance of 736 ohms. But when the bobbin was plunged into a bath of liquid helium the resistance apparently disappeared, and an electric current induced into the circuit continued to flow for many hours without perceptible diminution. Two years ago he reached within 1 degree of absolute zero, or the lowest temperature yet known in the world.

From Week to Week

THE DUKE OF YORK visited the works of Kynochs, Ltd., at Birmingham, on Friday, February 19.

Mr. CHARLES ROBERTS, Stockport, director of the Calico Printers' Association, left £24,124 (net personalty, £20,784).

SIR MAX AND LADY MUSPRATT, ex-Liberal members of Liverpool City Council, have now formally joined the Conservative Party.

DR. G. C. CLAYTON, M.P. for Widnes, and director of the United Alkali Co., is in London and is suffering from temporary indisposition.

PROFESSOR G. G. HENDERSON, President of the Institute of Chemistry, will attend the dinner of the local section of the Institute at Bristol to-day (Saturday).

NEARLY £1,500 has now been guaranteed to the Sir George Beilby Memorial Fund. The fund will provide awards for distinguished work in applied chemistry, chemical engineering, and metallurgy.

PROFESSOR W. C. McC. LEWIS, Brunner Professor of Physical Chemistry, Liverpool University, and Professor R. S. Troup, Forest Products Research Board, have been nominated for election to the Royal Society.

A SERIOUS FIRE broke out at an oil cake mill belonging to Lever Brothers, Ltd., at Port Sunlight, on Thursday. It took several brigades seven hours to master the outbreak. There was no personal injury.

AN AUSTRIAN CHEMICAL FUSION is reported in the announcement that the two largest chemical concerns, the Chemosan A. G. and the Vereinigte Drogen, have been amalgamated. The first-named company has interests in Hungary and Czechoslovakia.

THE CHEMISTRY OF PHOTOGRAPHY was the subject of the last of a series of lectures on "Chemistry in Everyday Life" given by Professor Stewart at Belfast University on Thursday, February 18, under the auspices of the Workers' Educational Association.

THE SALE BY AUCTION is announced and will shortly take place of the Eagle Chemical Works, Oswaldtwistle, near Accrington. Chemical plant and machinery will be included; particulars from E. Rushton, Son, and Kenyon, 13, Norfolk Street, Manchester.

TO SAFEGUARD THE BRITISH GLASS TRADE a conference was held at Birmingham on Saturday, February 20. Protection under the Safeguarding of Industries Act was urged and members of Parliament present promised to ask the Board of Trade to reopen the matter.

THE CURRENT NUMBER of *La Revue des Produits Chimiques* (February 15, 1926) contains a complete translation, with illustrations, of the article on "The Manufacture of Salvarsan and its Derivatives," by Dr. W. W. Myddleton, which appeared in THE CHEMICAL AGE of June 13, 1925.

CONTROL OF THE GERMAN KOHOLYL A.G., which owns five factories producing chemical pulp, paper, etc., has been obtained by the Inveresk Paper Co., who have purchased all but a hundred of the 22,000 shares and have transferred them to the International Pulp and Chemical Co., Ltd. The Koholyl concern was part of the Stinnes group.

SIR ALFRED MOND returned on Sunday from the South of France. He is reported to have stated that he has not returned to apply for the Chiltern Hundreds, and he has not made a decision as to contesting Carmarthen. Business matters have caused his early return. Sir Alfred will visit Newcastle next month as the guest of the Northern Conservative Club.

THE BRITISH SUGAR BEET SOCIETY is of the opinion that a small plant should be set in England to test the de Vecchis process as planned by the Ministry Commission, but that in the meantime the process must be regarded as in an experimental stage with commercial possibilities unproven and known results are not such as to discourage investment in present methods.

BIRMINGHAM'S CITY ANALYST, Mr. J. F. Liverseege, addressed a meeting of the local section of the Institute of Chemistry on Wednesday, and referred to the work of his department. Dealing with samples of adulterated foodstuffs exhibited at the meeting, he said they had been collected over a number of years. The adulterated samples were curiosities rather than the general rule. Lantern slides were shown.

THE CREDITORS interested in the matter of the voluntary liquidation of J. J. Rigby, soap manufacturers, Comus Street, Salford, met at Manchester on Monday. A statement of affairs disclosed ranking liabilities of £33,196 12s. 8d., all due to unsecured creditors. There was also a fully secured creditor for £4,028. The assets were estimated at £24,861 16s. 2d., with net assets of £23,553 2s. 3d., or a deficiency of £9,643 10s. 5d. so far as creditors were concerned. The liquidator pointed out that negotiations were proceeding for a sale of the business. Two years ago the company was quite solvent. The present position was stated to be largely due to a contract entered into for a year which resulted in a heavy loss. A resolution was passed confirming the appointment of Sir T. Smethurst as liquidator, and of a committee representing creditors, including Brunner, Mond and Co., Ltd. (£586).

THE DEGREE OF D.Sc. in Chemistry has been awarded to Mr. F. L. Usher (External Student) by London University.

UNEMPLOYMENT among the 4,943 members of the Institute of Chemistry during January stood at 2·14 per cent. In January, 1925, the percentage was 3·3.

A FINE of £5 and 25s. costs was imposed at Halifax on Friday, February 19, on Edward Vernon Blakey, dyer, of Halifax, for driving a motor-car in a dangerous manner.

SUFFERING FROM SEVERE BURNS caused by the upsetting of a quantity of benzene, J. Firth, laboratory assistant at Leeds University, was admitted to Leeds Infirmary on Friday, February 19.

VICKERS, LTD., have been successful in securing an additional order for the third unit for the Holborough Cement Works, Snodland, Kent, which comprises a kiln, cooler, wash mill and mixer plant.

THE HOME SECRETARY has appointed Major T. H. Crozier to be Chief Inspector of Explosives in succession to Sir Aston Cooper-Key, retired, and Colonel R. A. Thomas to be Second Inspector of Explosives in place of Major Crozier.

FUMES ARISING FROM THE CARGO of a British India liner, *Malda*, caused the death of one of the officers and of a Lascar when on the homeward journey from Calcutta. It is thought that the gases may have arisen from skins in the cargo.

MR. R. DU BOIS, sales manager of the Graesser-Monsanto Chemical Works, Ruabon, North Wales, was present at the two-day convention of the Monsanto Chemical Works, St. Louis, on February 1 and 2. The event marked the company's 25th year.

AN INVITATION of the Canadian Institute of Mining and Metallurgy to hold the second Empire Mining and Metallurgical Congress in Canada in August-September, 1927, has been accepted by the Empire Council of Mining and Metallurgical Institutions.

DEATH FROM LEAD POISONING was the verdict returned at the inquest on James P. Dygman, painter, of Kendal Street, Manchester, on Monday. The City Analyst said that the lead poison had been in the system for some months, probably over years, and had accelerated death.

DURING JANUARY there were 8,504 unemployed insured chemical etc., workers, including temporary stoppages. Six fatal accidents occurred in the industry and in various trades 26 cases of lead poisoning were reported (4 fatal), 1 case of chronic benzene poisoning, 12 cases of epitheliomatous ulceration (4 fatal), and 4 cases of chrome ulceration.

TO AID GERMAN INDUSTRY and trade the German Government propose to make a loan of £5,000,000 to railways, and £15,000,000 to enable the manufacture of goods for Russia.—It is reported that the Krupp concern has just reduced the number of its employees from 42,000 to 20,000, of whom 10,000 are working short time. Some 3,000 have been dismissed from the Thyssen mines.

AN IMPORTANT REPORT by an independent mining engineer on platinum in the Transvaal is published by the *Mining and Industrial Magazine*, Johannesburg. He anticipates an output of 18,000 oz. this year and an output of 80,000 oz. to 100,000 oz. in 1927, and considers that the price of the metal will fall to such a degree that only the richest and most extensive propositions will survive.

A PAPER ON "Some Further Evidence of Variation in the Atomic Weight of Boron" was read by Mr. P. L. Robinson to the Society of Chemical Industry at Newcastle, on Wednesday. Professor H. Louis presided. The paper was based on experiments performed by Professor H. V. A. Briscoe, Mr. Robinson and Dr. G. E. Stevenson, who is now continuing his research in America with a Commonwealth Fellowship which he gained largely through this work.

THE DANGERS OF CELLULOID were emphasised at the City of London fire inquest on the recent fire at the premises of Greenhill and Sons, Ltd., celluloid manufacturers, Blackfriars. Mr. Thompson, City of London inspector under the Petroleum and Explosives Act, said that these premises at the commencement of the war were allowed to have stored in them approximately five tons of celluloid, but this was discontinued at the end of the war, and the premises were not afterwards registered. The owners of the premises were allowed to store 112 lb. of raw celluloid without registration, and any quantity of manufactured celluloid goods. If more than that quantity of celluloid was stored the place became a store, and should be registered.

THAT A COMPENSATION CLAIM was not made within six months, the limit specified by the Act, was a point raised in a case before Judge McCleary at Huddersfield County Court on Wednesday. The applicant was Arthur Hill, chemical labourer, of Huddersfield, and the respondents L. B. Holliday and Co., Ltd., chemical manufacturers, of Huddersfield, and the claim was for compensation at the rate of 35s. per week from April 28, 1924. The Judge said he was satisfied that the man was in such a state of mental inertia as to provide a reasonable cause for not making a claim within the six months limit. He found that the respondents had not been prejudiced through the absence of legal notice, and awarded the applicant compensation at the rate of 16s. 6d. per week during total incapacity, from April 28, 1924, to April 4, 1925, and compensation of 15s. per week from April 4, 1925, and onwards. The applicant was injured when a barrel on which he was standing, collapsed. Stay of execution was granted.

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Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each

Abstracts of Complete Specifications

245,912. Treatment of Liquids, Gases, or Solutions with Active Carbon. H. E. Potts, Liverpool. From Naamlooze Vennootschap Algemeene Norit Maatschappij, 2, Den Texstraat, Amsterdam, Holland. Application dates, February 22, and May 9, 1924.

Carbon which has been activated by treating with gases is a good filtering agent but does not usually possess such a high adsorption power as carbon prepared by treating vegetable matter with carbonising and dehydrating agents such as zinc chloride, but this carbon is a bad filtering agent. In this invention, active carbon is obtained having good adsorbing and filtering properties. A retort is provided with rods arranged internally so as to provide staggered paths for gases, and crude oil is burned with a regulated quantity of air to produce a temperature of 1,000°–1,200° C. Superheated steam is also introduced, and dry distilled pine wood charcoal in granules of 2–3 mm. diameter. The carbon obtained has an adsorptive power of 3–5 times that of "Norit" carbon. The carbon is lixiviated with acid and dried, and contains 98–99 per cent. of carbon and 0·1–1 per cent. of ash. It has a true specific gravity of 2·0–2·2, and an apparent specific gravity of 0·06–0·1. The true specific gravity is thus unusually high, and the apparent specific gravity unusually low. The heat of adsorption of benzene is 40–50 calories per gram of carbon, compared with 20–30 calories previously obtained. The iodine adsorption capacity is above 80 per cent.—*i.e.*, more than 80 per cent. of the iodine in 50 cc. decinormal iodine solution is adsorbed by 500 mg. of the carbon. Examples are given of the use of this carbon for decolorising raw sugar solutions, bleaching linseed oil, decolorising wine, as a support for the nickel catalyst for the hydrogenation of oils, for decomposing sulphuretted hydrogen, and for removing benzol from coke-oven or illuminating gas.

245,991. Chlor Derivatives of Methane, Production of. H. Wade, London. From S. Kapern and Bros., 636, West 22nd Street, Chicago, Ill., U.S.A. Application date, April 27, 1925.

The process is for obtaining a high yield of methylene chloride from methane and chlorine. A mixture of methyl chloride and methane is chlorinated, the methylene chloride is condensed, and the remaining methyl chloride and methane returned with fresh chlorine and methane to the apparatus. The apparatus comprises a mixer, chlorinator, acid scrubber, gas reservoir, and a compressor, and condenser which condense the higher chlorides. The liquefied gases pass to a receiver, and the methane and most of the methyl chloride pass to the gas reservoir and thence back to the system. The materials in the reaction chamber consist of 10–30 per cent. chlorine, and 70–90 per cent. methyl chloride and methane together.

246,000. Drying Bleaching Powder. J. T. Conroy, A. Lamble, J. J. Latham, and The United Alkali Co., Ltd., Cunard Building, Liverpool. Application date, May 15, 1925.

It has been found that bleaching powder may be dehydrated without decomposition by a gradual removal of the moisture by subjecting the powder to hot air or gas on the counter current principle, so that the temperature of the bleaching powder rises progressively as the moisture content is decreased. An apparatus for carrying out the drying is described.

246,210. Purification of Benzol and Similar Hydrocarbons. K. Cox, 311, Upper Richmond Road, Putney, London, S.W., and P. J. McDermott, 3, Parsonage, Manchester. Application date, October 21, 1924.

The object is to avoid the employment of separate filtering or agitating plant in the treatment of light distillates for the removal of gum-forming constituents. It has been found that benzol or petrol can be purified during the ordinary fractional distillation if the still contains ground bauxite, kaolin, soapstone, or other micro-porous natural earths and clays. These should be ground to pass through a 200 mesh screen, but are not otherwise treated or dried. The light unsaturated hydrocarbons which are of value in the final product are not removed by this method of polymerising the gum-forming hydrocarbons.

246,272. Dissolving and Gelatinising Cellulose Esters such as Nitro-Cellulose and like Cellulose Compounds, Process for. V. Plinatus, 14, Rue Royer-Collard, Paris. Application date, December 4, 1924.

Celluloses are gelatinised by treating them with mono-, di- or tri-butyrin diluted with a considerable quantity of water, with the simultaneous application of heat and agitation. It has been found that the gelatinising effect of these substances is accelerated if their viscosity is reduced by the addition of a considerable quantity of water. The reaction is then less violent and more uniform. The process can be effected by simultaneous application of heat and pressure on the mixture, or by subjecting the cellulose esters to preliminary treatment by finely dispersing them with water in a kneading machine so that the ester contains more than 18 per cent. of water.

246,355. Recovering or Separating Caustic Hydroxides from Solutions containing them, Process for. J. Y. Johnson, London. From The Viscose Co., Marcus Hook, Delaware Co., Pa., U.S.A. Application date, October 23, 1924.

This process is for recovering caustic hydroxides from the waste solutions obtained in the steeping operation in the manufacture of artificial silk, from waste liquor obtained in the mercerisation of yarns, and from "black liquor" from the digesters of pulp mills. The separation of the caustic hydroxide from hemi-celluloses, hydroxy-celluloses, oxy-celluloses, and other organic or inorganic matter is effected by dialysis. The liquor is supplied to a dialytic cell having a semi-permeable membrane which is immersed in water. Caustic hydroxide diffuses through the membrane to the water and the impurities remain in the cell. A number of such cells is preferably employed, through which the liquor passes continuously in series while the water passes in contact with them in counter current. The specific gravity of the solution decreases as it loses its caustic alkali, and an upward extension of the cells is necessary to provide a sufficient head of liquid. By regulating the flow of liquor and the flow of water the strength of caustic solution obtained can be controlled. The permeable membrane employed is preferably obtained by immersing cotton in sulphuric acid of specific gravity of 1·10 at a temperature below 30° C. for two minutes, and then removing the excess of acid. A suitable apparatus is described in Specification No. 237,468 (see The Chemical Age, Vol. XIII, p. 231).

246,361. Deposition of Aqueous Mineral Suspensions, Process for Effecting. I. Traube, 29, Schloss-strasse, Charlottenburg, Germany. Application date, May 7, 1925.

It is known that the addition of colloids to an aqueous suspension of galena, blende, various kinds of gangue, etc., delays the deposition of the suspended matter. In this invention, the deposition of some such suspensions or slimes is considerably accelerated by the addition of a very small proportion of an extract of a plant such as Carrageen moss or Iceland moss. Thus the deposition of a suspension of galena, heavy spar, and the like is accelerated by the addition of Carrageen moss, but a suspension of blende is not affected in this manner, and its deposition may be hindered. In the latter case the further addition of a small proportion of a salt or electrolyte, particularly alkaline earth sulphate or carbonate, will accelerate the deposition of the suspended matter. Thus 1 litre of a slime containing 5 per cent. of Silesian ore (galena, blende, clay, etc.) can be deposited in two minutes by the addition of 0·0025 grams of Carrageen moss compared with more than 50 minutes without this addition. In another case a clay ironstone slime can be caused to settle in 50 minutes by the addition of a Carrageen moss extract, but in 4 minutes with the further addition of gypsum.

246,377. Calcium Nitrate Fertiliser, Production of. J. Y. Johnson, London. From Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, June 22, 1925.

This fertiliser is a compound of calcium nitrate and urea, which is obtained by spraying the hot solutions in a stream of gas and the drops of spray solidify, forming the solid salt in granular form. The proportion of urea added may be that required to form the double compound, or 4 molecules of urea for each molecule of calcium nitrate, or a smaller proportion down to 1 molecule of urea for each molecule of calcium nitrate. In the latter case the calcium nitrate solution should be as concentrated as possible and hot air or gas should be employed to obtain a dry product. In an example, the solution of calcium nitrate of 65° Bé. and of a temperature of 80°–100° C. is mixed with urea and sprayed from the nozzle by compressed air. A dry granular product is obtained which requires no subsequent treatment.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: 226,180 (Naamlooze Vennootschap Philips' Gloeilampenfabrieken), relating to separation of hafnium and zirconium compounds, see Vol. XII, p. 163; 226,797 (Soc. of Chemical Industry in Basle), relating to manufacture of dyestuffs, see Vol. XII, p. 209; 227,440 (Fabrique de Produits Chimiques, Ci-devant Sandoz), relating to trisazo dyestuffs for dyeing cotton, see Vol. XII, p. 257; 234,109 (E. Thiesen), relating to apparatus for purifying, cooling, heating, mixing, or absorbing gases or vapours, see Vol. XIII, p. 108; 236,145 (I. W. Cederberg), relating to catalytic combustion of explosive gaseous mixtures, see Vol. XIII, p. 232; 239,527 (G. Austerweil), relating to preparation of menthol, see Vol. XIII, p. 477.

International Specifications not yet Accepted

244,736. Distilling Hydrocarbons. A. Schmalenbach, 13, Pelmannstrasse, Essen, Germany. International Convention date, December 22, 1924.

In separating benzol from washing oils, the first still is maintained under a high degree of vacuum by washing the vapours with an absorber, or passing them through a condenser at low temperature before reaching the vacuum pump. The condensate passes into the base of a rectifying column surmounted by a dephlegmator, and the vapour passes to a condenser which is connected to the vacuum pump through a device employing a column of liquid to prevent the vacuum on the condenser from being as low as that produced by the pump.

244,739. Perylene Compounds and Dyes. A. Pongratz, 25, Lessingstrasse, Graz, Styria, Austria, and A. Zinke, 30, Castelfeldgasse, Graz, Styria, Austria. International Convention date, December 19, 1924.

Perylene and other compounds are halogenated by a nascent halogen in the presence of a solvent such as nitrobenzene. Thus, an acetic acid solution of hydrogen peroxide and an acetic acid solution of concentrated hydrochloric acid are simultaneously run into a solution of perylene in nitrobenzene, yielding perylene dichloride, tetrachloride, and hexachloride. Isoviolanthrone dichloride is obtained in a similar manner.

244,746. Organo-antimony Compounds. Chemische Fabrik von Heyden Akt.-Ges., Radebeul, Dresden, Germany. International Convention date, December 18, 1924.

A solution of antimony oxide in hydrochloric acid, mixed with glycerin, is added to an ice-cooled solution of diazotised aniline and caustic soda added. Phenylstibinic acid is precipitated with hydrochloric acid and purified. The addition of glycerin as above ensures a higher yield.

44,747. Nicotinic Acid Derivatives. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, December 20, 1924.

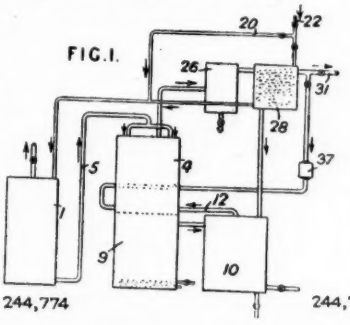
Quinolinic acid anhydride is heated with excess of diethylamine to form the diethylamine salt of quinolinic diethylamic acid. If the latter is heated, carbon dioxide and diethylamine are evolved and partly combine to form diethylamine carbaminate. The residue is distilled under reduced pressure to obtain the diethylamide of nicotinic acid. The dipropylamide, diamylamide, piperidide, diallylamide, methylpropylamide, and ethylpropylamide are similarly obtained.

244,764. Sulphuric Acid. H. Petersen, 6, Hohenzollernstrasse, Steglitz, Berlin. International Convention date, December 16, 1924.

In the manufacture of sulphuric acid by the use of sprays or packing material to ensure contact between the gases and liquids, oxidation being effected by nitro or nitrosyl sulphuric acid, the latter is supplied in such quantity that the acid leaving the oxidation chamber still contains a high percentage of nitrogen compounds. Only the portion which is withdrawn as commercial acid is denitrated.

244,774–5. Separating phenol from gas liquor. L. W. Heffner, East Norristown, Pa., U.S.A., and W. Tiddy, Jeffersonville, Pa., U.S.A., International Convention date, December 16, 1924.

244,774. Phenol is recovered from gas liquor or other liquor containing it in small quantities by heating to 98° C. in a current of ammonia which carries off the phenol as ammonium phenolate. The gas liquor passes through a pipe 22 to a coil in a dephlegmator 28 and thence to a preheater 1. The liquor then passes to a free ammonia still 4 over a liming chamber 9, and thence to a fixed ammonia still 10. The gases return to the still 4 through a pipe 12, the conditions being



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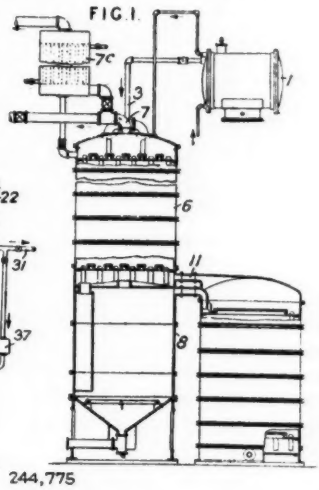


244,775

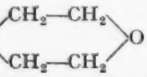
such that the liquor is at 98°–103° C. at the top of the still. The distillate passes through a cooler to reduce the temperature to 98° C. and condense water, and then to a phenol absorber 26 and dephlegmator 28, and to a saturator or condenser. Part of the ammonia returns through a pump 37 to the base of the still 4. Liquid passes from the dephlegmator 28 to the fixed ammonia still 10.

244,775. Gas liquor is preheated to 98° C. in a steam heater 1 and passes by a pipe 3 to a free ammonia still 6 above a liming chamber 8, and thence to a fixed ammonia still. The vapour from the latter passes into the base of the still 6, and the vapour from this passes through the pipe 7 to a saturator. Phenol may be separated from the gases leaving the saturator, or the vapours may alternatively pass to a phenol absorber containing caustic soda. Water vapour is removed in a reflux condenser 7^c. The ammonia vapour free from phenol is passed through an oil scrubber and charcoal filter, and then absorbed.

244,782. Dyes. Akt.-Ges. für Anilin-Fabrikation, Treptow, Berlin. International Convention date, December 16, 1924.

Tetrazo compounds of chloro-substituted 4 : 4^1 diaminodiphenylmethanes or homologues thereof are coupled with the usual components to obtain azo dyes. The products may be further diazotised and coupled with other components, or they may be further coupled with diazo compounds. Chloro-4 : 4^1-diamino-diphenylmethanes and homologues are obtained by condensing the chloranilines with formaldehyde and conversion of the condensation product. Some of the products are fast dyes for wool, others for cotton, and others are applicable as lake or pigment dyestuffs. Tetrazotised 4 : 4^1-diamino-3 : 3^1-dichloro-diphenyl-methane may be coupled with 2-naphthol-4-sulphonic acid, 1-naphthol-3 : 8-disulphonic acid, 1-acetamino-8-naphthol-3 : 6-disulphonic acid, 2-naphthylamine-6-sulphonic acid, 1-(2^1-chlor-5^1-sulphophenyl)-3-methyl-5-pyrazolone, or β-naphthol. Many other examples of the various classes of dyestuffs are given.

245,098. SOLVENTS. Akt.-Ges. für Anilin-Fabrikation, Treptow, Berlin. International Convention date, December 23, 1924.

Dioxane  is miscible with water and the usual organic solvents, such as fatty and mineral oils, turpentine, benzine, solvent naphtha, etc., and is used as a solvent or wetting agent. It is a solvent for fats, waxes, solid hydrocarbons, resins, rubber, camphor, borneol, dyestuffs, cellulose esters and ethers, bromine, iodine, phosphorus, sulphur, ferric chloride, mercuric chloride, boric acid, chromic acid, etc. Powders or fibres are readily wetted if treated previously with dioxane, and it enables a material such as felt to be dyed throughout.

245,107. SYNTHETIC DRUGS. Chemische Fabrik Auf Actien (vorm. E. Schering), 170, Mullerstrasse, Berlin. Assignees of R. Mayer, 39, Siebensterngasse, Vienna. International Convention date, December 24, 1924.

Equimolecular proportions of 1-phenyl-2 : 3-dimethyl-4-dimethyl-amino-5-pyrazolone and a C : C-disubstituted barbituric acid are dissolved in alcohol or acetone at a temperature below 100° C. to obtain double compounds. Air is excluded by passing carbon dioxide through the solution. Diethyl-, dipropyl-, phenyl-, ethyl-, and isopropylpropenyl-barbituric acids are described.

LATEST NOTIFICATIONS

247,523. Process for the manufacture of alkali hydrosulphites. Farbenfabriken vorm. F. Bayer and Co. February 13, 1925.

247,524. Process for the manufacture of alkali hydrosulphites. Farbenfabriken vorm. F. Bayer and Co. February 14, 1925.

247,556. Manufacture of dyestuffs. Soc. of Chemical Industry in Basle. February 14, 1925.

247,582. Manufacture and production of organic compounds from coal and other like materials. I. G.Farbenindustrie Akt.-Ges. February 14, 1925.

247,583. Manufacture and production of organic compounds from coal and other like materials. I. G. Farbenindustrie Akt.-Ges. February 14, 1925.

247,584. Manufacture and production of organic compounds from coal and other like materials. I. G. Farbenindustrie Akt.-Ges. February 14, 1925.

247,585. Manufacture and production of organic compounds from products of the distillation or extraction of coal and the like. I. G. Farbenindustrie Akt.-Ges. February 16, 1925.

247,586. Manufacture and production of organic compounds from products of the distillation or extraction of coal and the like. I. G. Farbenindustrie Akt.-Ges. February 16, 1925.

247,587. Manufacture and production of organic compounds from products of the distillation or extraction of coal and the like. I. G. Farbenindustrie Akt.-Ges. February 16, 1925.

247,588. Process for preparing emulsions. I. G. Farbenindustrie Akt.-Ges. February 11, 1925.

247,611. Process for treating cellulose derivatives. I. G. Farbenindustrie Akt.-Ges. February 16, 1925.

Specifications Accepted with Date of Application

235,129. Hydrogen, Manufacture of, by the partial liquefaction of gaseous mixtures containing the same. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. June 3, 1924.

236,591. Resinous condensation products. British Thomson-Houston Co., Ltd. July 5, 1924.

236,891. Polymerised products from styrol and its homologues, Manufacture of. Naugatuck Chemical Co. July 12, 1924.

238,899. Distillation of carbonaceous material, Apparatus for. M. Frankl. August 23, 1924.

240,126. Revivifying activated charcoal used in the purification of fermentation carbon dioxide, Process for. A. A. Backhaus. September 17, 1924.

240,127. Revivifying activated charcoal, Apparatus for. A. A. Backhaus. September 17, 1924.

241,579. Alkali salts of aromatic sulpho chloramides, Manufacture of. Farbenfabriken vorm. F. Bayer and Co. October 18, 1924.

242,669. Organic mercury compounds, Process for the manufacture of. Farbenfabriken vorm. F. Bayer and Co. November 10, 1924.

243,348. Tetraglucosan, Process for the manufacture of. J. Kerb. November 20, 1924.

246,889. Nitric acid, Process for the manufacture of, from the nitrous gases arising during the catalytic combustion of mixtures of ammonia and oxygen. I. W. Cederberg. October 1, 1924.

246,930. Volatile liquids, Method of and apparatus for the extraction and recovery of. E. A. Ironside. November 8, 1924.

246,937. Purification of liquids. F. G. P. Remfry and A. E. Dunstan. November 13, 1924.

246,954. Carbon for decolorising and deodorising and other processes, Manufacture of. Artificial Coal Co. (Hamon Process), Ltd., and Count L. Le W. Hamon. December 2, 1924.

246,978. Gas-washers. Kirkham, Hulett, and Chandler, Ltd., and S. Hersey. January 3, 1925.

246,984. Dyeing acetyl cellulose or fabrics containing the same, and products for use therein. British Dyestuffs Corporation, Ltd., J. Baddiley, A. Shepherdson, H. Swann, J. Hill, and L. G. Lawrie. January 7, 1925. Addition to 224,077.

247,003. Dyestuffs of the pyrone series, Manufacture of. W. Carpmael. (*Farbenfabriken vorm. F. Bayer and Co.*) January 31, 1925.

247,050. Purification of gases. J. Y. Johnson. (*Badische Anilin and Soda Fabrik.*) May 21, 1925.

247,052. Colouring matter pastes, Manufacture and production of. J. Y. Johnson (*Badische Anilin and Soda Fabrik.*) May 29, 1925.

Applications for Patents

American Cellulose and Chemical Manufacturing Co., Ltd., and British Celanese, Ltd. Treatment of solutions of fatty acids. 4,680. February 18.

Baddiley, J., British Dyestuffs Corporation, Ltd., Hill, J., and Shepherdson, A. Manufacture of dyes for acetyl cellulose. 4,430. February 16.

Bakelite Ges. Purification of phenolaldehyde condensation products. 4,465. February 16. (Germany, February 17, 1925.)

Bakelite Ges. Production of compositions containing phenolaldehyde condensation products. 4,466. February 16. (Germany, February 17, 1925.)

Bakelite Ges. Purification of phenolaldehyde condensation products. 4,553. February 17. (Germany, March 6, 1925.)

Böhm, Brüder. Dyeing apparatus. 4,457. February 16. (Austria, February 25, 1925.)

Böniger, M. Chemical Works, formerly Sandoz. Manufacture of dyestuffs and intermediate products therefor. 4,850. February 19.

British Synthetics, Ltd., and Higgins, E. B. Manufacture of dye intermediates. 4,565. February 17.

Carpmael, W., and Chemische Fabrik auf Actien vorm. E. Schering. Manufacture of organic auto-mercapto acids and salts thereof. 4,305. February 15.

Carpmael, W., and Farbenfabriken vorm. F. Bayer and Co. Manufacture of fungicides. 4,749. February 19. (January 27, 1925.)

Carpmael, W., I. G. Farbenindustrie Akt.-Ges. Vulcanisation of rubber. 4,301. February 15.

Carpmael, W. Manufacture of condensation products of crotonaldehyde. 4,302. February 15.

Carpmael, W. Manufacture of condensation products of substituted acroleines. 4,303. February 15.

Carpmael, W. Manufacture of complex antimony compounds. 4,304. February 15.

Carpmael, W. Manufacture of vat dyestuffs. 4,599. February 17.

Carpmael, W. Manufacture of silicic acid gels. 4,859. February 19.

Coley, H. E. Activating carbon, etc. 4,697. February 18.

Coley, H. E. Manufacture of sulphides. 4,698. February 18.

Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, and Freudenberg, H. Manufacture of alkali metal cyanides. 4,319. February 15.

Eisenstein, A. Process for separating fatty acids from glycerides. 4,453. February 16.

I. G. Farbenindustrie Akt.-Ges. Treating cellulose derivatives. 4,427. February 16. (Germany, February 16, 1925.)

I. G. Farbenindustrie Akt.-Ges. Production of azo dyestuffs, etc. 4,842. February 19. (Germany, April 18, 1925.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of complex antimony compounds. 4,860. February 19. (Germany, February 19, 1925.)

Klaversteijn, W. E. Extraction of tartaric salts. 4,308. February 15.

Lever Bros., Ltd., and Machennan, K. Treatment of oils and fats. 4,737. February 18.

Maudsley, R. T., and Packards and J. Fison (Thetford), Ltd. Sulphuric-acid chambers. 4,600. February 17.

Pollak, F. Manufacture of condensation products of urea, etc., and aldehydes. 4,598. February 17. (Austria, March 3, 1925.)

Silberrad, O. Manufacture of actyl derivatives of cellulose, etc. 4,895. February 20.

Soc. of Chemical Industry in Basle. Manufacture of intermediate products and dyestuffs therefrom. 4,843. February 19. (Switzerland, March 18, 1925.)

Soie d'Aubenton. Process for treating soda solutions contaminated with cellulose-like bodies. 4,861. February 19. (France. March 11, 1925.)

Tallada, F. Anodes for production of organic acids. 4,678, February 18.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £37 per ton, Powder, £39 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. d/d; Contract, £8 10s. d/d, 4 ton lots.

BORAX, COMMERCIAL.—Crystal, £23 per ton. Powder, £24 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORATE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.

SODIUM CHLORATE.—3d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—4¾d. to 5¼d. per lb. Crude 60's, 1s. 4d. to 1s. 6d.

ACID CRESYLIC 97/99.—1s. 7d. to 1s. 9½d. per gall. Pale, 95%, 1s. 5d. to 1s. 8d. per gall. Dark, 1s. 3d. to 1s. 4d. per gall. Good demand.

ANTHRACENE.—A quality, 3d. to 4d. per unit; Paste 40%, 3d. per unit per cwt. Nominal price.

ANTHRACENE OIL, STRAINED.—7d. to 8d. per gall. Unstrained, 6½d. to 7½d. per gall.

BENZOL.—Crude 65's, 1s. 2½d. to 1s. 3½d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 1s. 10d. to 2s. 2d. per gall., ex works in tank wagons.

TOLUOL.—90%, 1s. 9½d. to 2s. per gall. Pure, 2s. to 2s. 2d. per gall.

XYLOL.—2s. to 2s. 6d. per gall.

CREOSOTE.—Cresylic, 20/24%, 9d. to 10d. per gall. Standard specification, middle oil, heavy, 6½d. to 7d. per gall.

NAPHTHA.—Crude, 9d. to 1s. per gall. Solvent 90/160, 1s. 5d. to 1s. 8d. per gall. 2s. paid in South. Steady demand. Solvent 90/190, 1s. to 1s. 5d per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £3 10s. to £4 10s. per ton. Whizzed or hot pressed, £5 10s. to £7 10s.

NAPHTHALENE.—Crystals and Flaked, £11 10s. to £13 per ton, according to districts.

PITCH.—Medium soft, 72s. 6d. to 75s. per ton, according to district. Market active.

PYRIDINE.—90/140, 19s. 6d. to 21s. per gall. Firmer. Heavy, 7s. to 10s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—7s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—8s. per lb.

ACID H.—3s. 3d. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—2s. 2d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—7d. per lb. naked at works.

ANILINE SALTS.—7d. per lb. naked at works.

BENZALDEHYDE.—2s. 1d. to 2s. 2d. per lb. Good home inquiry.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

o-CRESOL 29/31° C.—3d. per lb. Demand quiet.

m-CRESOL 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.

p-CRESOL 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—1s. 11d. to 2s. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLANILINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d. Fair home inquiry.

B-NAPHTHOL.—11d. to 1s. per lb. d/d. Fair home inquiry.

a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d. Fair home inquiry.

B-NAPHTHYLAMINE.—3s. 9d. per lb. d/d. Fair home inquiry.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. 6d. per lb. d/d.

p-NITRANILINE.—1s. 9d. to 1s. 10d. per lb. d/d. Fair home inquiry.

NITROBENZENE.—5d. per lb. naked at works. Good home inquiry.

NITRONAPHTHALENE.—10d. per lb. d/d.

R. SALT.—2s. 4d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 9d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb. naked at works.

p-TOLUIDINE.—2s. 2d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 15s. to £9. Firmer. Grey, £17 10s. per ton. Better inquiry. Liquor, 9d. per gall. 32° Tw.

ACETONE.—£81 per ton.

CHARCOAL.—£7 5s. to £9 per ton, according to grade and locality. Demand good.

IRON LIQUOR.—1s. 6d. per gall. 32° Tw. 1s. 2d. per gall., 24° Tw.

RED LIQUOR.—9½d. to 1s. per gall.

WOOD CREOSOTE.—2s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 10d. per gall. 60% O.P. Solvent, 4s. 6d. per gall. 40% O.P. Very quiet.

WOOD TAR.—£3 to £5 per ton, according to grade.

BROWN SUGAR OF LEAD.—£40 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—2s. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£50 to £55 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¼d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—5s. 3d. per lb.

ZINC SULPHIDE.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, 80% B.P.—£38 10s. to £39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 6d. per lb. Keen competition met. Good demand.

ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity.

ACID, BORIC B.P.—Crystal, £43 per ton; Powder, £47 per ton. Carriage paid any station in Great Britain, in ton lots.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 3d. to 1s. 4d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, PYROGALLIC, CRYSTALS.—5s. 3d. per lb. Resublimed, 7s.

ACID, SALICYLIC.—1s. 3d. to 1s. 5d. per lb. Technical.—10½d. to 10¾d. per lb.

ACID, TANNIC B.P.—2s. 10d. per lb.

ACID, TARTARIC.—1s. 0½d. per lb., less 5%. Market firm.

AMIDOL.—6s. 6d. per lb., d/d.

ACETANILIDE.—1s. 7d. to 1s. 8d. per lb. for quantities.

AMIDOPYRIN.—12s. 6d. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.

AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.

ATROPINE SULPHATE.—11s. per oz. for English make.

BARBITONE.—10s. per lb.

BENZONAPHTHOL.—3s. 3d. per lb. spot.

BISMUTH CARBONATE.—15s. 6d. to 17s. 6d. per lb.

BISMUTH CITRATE.—12s. 9d. to 14s. 9d. per lb.

BISMUTH SALICYLATE.—12s. 6d. to 14s. 6d. per lb.

BISMUTH SUBNITRATE.—13s. to 15s. per lb. according to quantity.

BORAX B.P.—Crystal, £27; Powder, £28 per ton. Carriage paid any station in Great Britain, in ton lots.

BROMIDES.—Potassium, 1s. 9d. to 1s. 11d. per lb.; sodium, 1s. 10d. to 2s. 2d. per lb.; ammonium, 2s. 3d. to 2s. 5d. per lb., all spot.

CALCIUM LACTATE.—1s. 4d. to 1s. 6d. Market firmer.

CHLORAL HYDRATE.—3s. 3d. to 3s. 6d. per lb., duty paid.

CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

FORMALDEHYDE.—£40 per ton, in barrels ex wharf.

GUAIACOL CARBONATE.—7s. per lb.

HEXAMINE.—2s. 4d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 8d. per gallon f.o.r. makers' works, naked.

HYDROQUINONE.—4s. 8d. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.

IRON AMMONIUM CITRATE B.P.—2s. to 2s. 3d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 1d. to 2s. 4d. per lb.

MAGNESIUM CARBONATE.—Light Commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light Commercial, £67 10s. per ton, less 2½%, price reduced; Heavy Commercial, £23 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.

MENTHOL.—A.B.R. recrystallised B.P., 25s. net per lb., Synthetic, 17s. 6d. to 22s. 6d. per lb., according to quality. English make.

MERCURIALS.—Red oxide, 5s. 5d. to 5s. 7d. per lb.; Corrosive sublimate, 3s. 9d. to 3s. 11d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 4s. to 4s. 2d. per lb.

METHYL SALICYLATE.—1s. 7d. per lb.

METHYL SULPHONAL.—16s. 6d. per lb.

METOL.—9s. per lb. British make.

PARAFORMALDEHYDE.—1s. 11d. for 100% powder.

PARALDEHYDE.—1s. 3d. to 1s. 4d. per lb.

PHENACETIN.—4s. to 4s. 3d. per lb.

PHENAZONE.—6s. to 6s. 3d. per lb.

PHENOLPHTHALEIN.—4s. to 4s. 3d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—80s. per cwt., less 2½% for ton lots. Market very firm.

POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb. in cwt. lots. Quiet.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 7½d. per lb., spot, slightly easier.

QUININE SULPHATE.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.

RESORCIN.—3s. 9d. per lb. In fair quantities.

SACCHARIN.—55s. per lb. Fair inquiry.

SALOL.—3s. per lb.

SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.

SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923. 1s. 11d. to 2s. 2d. per lb., according to quantity.

SODIUM FERROCYANIDE.—4d. per lb. carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£14 to £15 per ton according to quantity, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—75s. to 80s. per cwt., according to quantity.

SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. per lb. Crystal, 1s. 11d. to 2s. 1d. per lb. Very heavy demand.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.

SULPHONAL.—11s. 6d. per lb. Limited demand.

TARTAR EMETIC, B.P.—Crystal or Powder, 1s. 8d. to 1s. 9d. per lb.

THYMOL.—12s. to 13s. 9d. per lb. Strong demand.

Perfumery Chemicals

ACETOPHENONE.—9s. per lb.

AUBEPINE (EX ANETHOL).—9s. 6d. per lb.

AMYL ACETATE.—3s. per lb.

AMYL BUTYRATE.—6s. 6d. per lb.

AMYL SALICYLATE.—3s. 3d. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. 3d. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. 3d. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 9d. per lb.

BENZYL BENZOATE.—2s. 9d. per lb.

CINNAMIC ALDEHYDE NATURAL.—17s. 6d. per lb.

COUMARIN.—11s. 9d. per lb.

CITRONELLOL.—15s. per lb.

CITRAL.—9s. per lb.

ETHYL CINNAMATE.—9s. per lb.

ETHYL PHTHALATE.—3s. per lb.

EUGENOL.—9s. 6d. per lb.

GERANIOL (PALMAROSA).—21s. per lb.

GERANIOL.—7s. to 16s. per lb.

HELIOTROPINE.—6s. per lb.

ISO EUGENOL.—14s. 6d. per lb.

LINALOL EX BOIS DE ROSE.—17s. 3d. per lb.

LINALYL ACETATE.—17s. 3d. per lb.

METHYL ANTHRANILATE.—9s. 3d. per lb.

METHYL BENZOATE.—5s. per lb.

MUSK KETONE.—30s. per lb.

MUSK XYLOL.—5s. 6d. per lb.

NEROLIN.—4s. per lb.

PHENYL ETHYL ACETATE.—12s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—32s. 6d per lb.

SAFROL.—1s. 4d. per lb.

TERPINEOL.—1s. 8d. per lb.

VANILLIN.—21s. 6d. to 23s. 3d. per lb. Good demand.

Essential Oils

ALMOND OIL.—12s. 6d. per lb.

ANISE OIL.—3s. 7d. per lb.

BERGAMOT OIL.—28s. 6d. per lb.

BOURBON GERANIUM OIL.—12s. per lb.

CAMPHOR OIL.—60s. per cwt

CANANGA OIL, JAVA.—16s. per lb.

CINNAMON OIL, LEAF.—5d. per oz.

CASSIA OIL, 80/85%.—10s. per lb.

CITRONELLA OIL.—Java, 85/90%, 3s. 4d. Ceylon, 2s. 5d. per lb.

CLOVE OIL.—7s. 2d. per lb.

EUCALYPTUS OIL, 70/75%.—1s. 10d. per lb.

LAVENDER OIL.—French 38/40%, Esters, 22s. 6d. per lb.

LEMON OIL.—12s. 6d. per lb.

LEMONGRASS OIL.—4s. 9d. per lb.

ORANGE OIL, SWEET.—13s. per lb.

OTTO OF ROSE OIL.—Bulgarian, 65s. per oz. Anatolian, 35s. per oz.

PALMA ROSA OIL.—12s. 6d. per lb.

PEPPERMINT OIL.—Wayne County, 120s. per lb. Japanese, 14s. per lb.

PETITGRAIN OIL.—9s. per lb.

SANDAL WOOD OIL.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

Atmospheric Nitrogen in Czechoslovakia

ACCORDING to the *Gazette de Prague*, a number of Czechoslovak industrialists have entered into negotiations with foreign companies, particularly in the United States and France, with the view of forming a company for the production of nitrogenous fertilisers from atmospheric nitrogen. A capital of 50 to 60 million Czechoslovak crowns would be necessary for the realisation of this project, in which Czechoslovak capitalists have hitherto not taken much interest. Proposals have, however, been made to erect a factory in the Pardubice region or in the neighbourhood of Stechovice. Czechoslovak experts have made detailed studies and are of the opinion that local hydraulic power could be utilised during the day, when it is not used for supplying electric light.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, February 25, 1926.

IF anything the turnover during this week has been better than last, but the continued uncertainty in the industrial world continues to delay that decided improvement which many discern in the offing. With few exceptions buying is confined to current requirements, but again we must remark that prices as a whole are very firm and, generally speaking, the standard of values tends to increase. Export trade is quiet.

General Chemicals

ACETONE remains in short supply for spot delivery. Price is very firm and the demand is steady.

ACID ACETIC is quietly active. There is no change in price but the disturbing factors in the market tend to disappear.

ACID FORMIC.—Price is firm owing to the disturbing of second-hand holdings. Price, £50 to £51 per ton.

ACID LACTIC is unchanged at £43 to £43 10s. per ton for 50% by weight.

ACID OXALIC.—The market is disturbed by realisations on the part of continental dealers. This phase can only be temporary as manufacturers' prices are very firm indeed.

ACID TARTARIC remains quiet and uninteresting.

ALUMINA SULPHATE is unchanged at £5 15s. per ton for 17-18%.

AMMONIUM CHLORIDE.—Price continues to sag in the absence of demand. Business has been done below £18 per ton.

ARSENIC.—The market remains lifeless, price nominally about £13 10s. per ton.

BARIUM CHLORIDE is scarce and firm at about £10 10s. per ton.

BLEACHING POWDER is unchanged.

CREAM OF TARTAR is in rather better demand and is quoted at £75 to £76 per ton.

EPSOM SALTS are quiet but firm at about £5 15s. per ton.

FORMALDEHYDE.—There is a steady trade of small dimensions. Price, £41 to £42 per ton.

LEAD ACETATE is rather firm at £43 10s. per ton for white and £42 10s. per ton for brown.

LIME ACETATE is unchanged.

LITHOPONE passes steadily into consumption and is quoted £19 10s. per ton.

METHYL ALCOHOL is in very small demand. Price £47 to £48 per ton.

METHYL ACETONE is very firm and scarce at £59 to £60 per ton.

POTASSIUM CARBONATE AND CAUSTIC are unchanged.

POTASSIUM CHLORATE is firm at 4¼d. per lb.

POTASSIUM PERMANGANATE is in steady demand and is quoted 7½d. per lb. to 8d. per lb.

POTASSIUM PRUSSIATE.—There is not much demand at the moment and there is a tendency towards realisation on the part of weak holders. First hand price is 7½d. per lb.

SODA ACETATE is very firm and scarce and is quoted £21 per ton.

SODA BICHROMATE is unchanged.

SODA CHLORATE is a firm market at 3⅛d. per lb. to 3⅜d. per lb.

SODA NITRITE is a little easier at £21 15s. per ton.

SODA PHOSPHATE is unchanged.

SODA PRUSSIATE is quiet and is quoted at 4½d. per lb.

SODA SULPHIDE is in fair demand, price unchanged.

ZINC SULPHATE is unchanged at £13 10s. per ton.

Coal Tar Products

There is little change to report in the market for Coal Tar Products from last week.

90% BENZOL is quieter, at 1s. 9d. per gallon, on rails, while motor benzol is quoted forward at 1s. 8½d. per gallon.

PURE BENZOL is unchanged at 2s. 1d. to 2s. 2d. per gallon, on rails.

CREOSOTE OIL is quoted at 6d. to 6½d. per gallon, on rails in the North, while the price in London is 7½d. per gallon.

CRESYLIC ACID is quoted at 2s. to 2s. 1d. per gallon, on rails, for the pale quality 97/99%, for export, while the dark quality 95/97%, also for export, is quoted at 1s. 11d. to 2s. per gallon. Pale cresylic for the home trade is slightly weaker, and is quoted at 1s. 6d. per gallon, on rails, while the dark quality is quoted at 1s. 4d. per gallon, on rails.

SOLVENT NAPHTHA is weaker, at 1s. 4d. to 1s. 4½d. per gallon, on rails.

HEAVY NAPHTHA is quiet, at 1s. 1d. to 1s. 2d. per gallon, on rails.

NAPHTHALENES are quiet, the lower grades being worth £4 to £4 10s. per ton, 76/78 quality about £6 per ton, and 74/76 quality about £5 10s. per ton.

PITCH.—Is in strong demand and prices have further advanced. To-day's values are approximately 65s. to 70s. per ton, f.o.b., U.K. ports.

Latest Oil Prices

LONDON.—LINSEED OIL, quiet. Spot, £32 5s., ex mill; February and March-April, £30 5s.; May-August, £30 10s.; September-December, £30 17s. 6d. RAPE OIL quiet. Crude, crushed, spot, £47 10s.; technical, refined, £50. COTTON OIL steady. Refined common edible, £42; Egyptian crude, £35; deodorised, £44. TURPENTINE firm and occasionally 6d. per cwt. higher. American, spot, 62s. 6d.; March-April, 63s.; May-June, 62s.; and July-December, 59s.

HULL.—LINSEED OIL.—Naked, spot, to May-August, £30 10s.; September-December, £30 15s. COTTON OIL.—Naked Bombay crude, £33 10s.; Egyptian crude, £35; edible refined, £38 10s.; technical, £37 5s. PALM KERNEL OIL.—Crushed naked, 5½ per cent., £43. GROUNDNUT OIL.—Crushed-extracted, £43; deodorised, £47. SOYA OIL.—Extracted and crushed, £38 10s.; deodorised, £42. RAPE OIL.—Crushed and extracted, £47 10s. per ton, net cash terms, ex mill. CASTOR OIL unchanged. COD OIL easier. Spot, 27s. to 27s. 6d. per cwt. barrels.

Nitrogen Products Market

Export.—During the last week the sulphate of ammonia position has remained unchanged with producers holding firm at £12 7s. 6d. per ton, f.o.b. U.K. port, but with little business being done. Most of the inquiries received have been from the Far East, but the Continent is now taking further interest.

Home.—The home trade continues very briskly. The demand from Yorkshire and the Western counties as usual has come in earliest and merchants in these parts report large orders. It appears that the season will be a very heavy one. There is no likelihood of any change being made in the home price.

Nitrate of Soda.—Nitrate continues firm. Cargoes c.i.f. chief European ports are changing hands at £11 11s./£11 14s. per ton. As the large stocks in Europe have for the most part been liquidated, there is no prospect of a drop in price until the present season ends.

Chemical Industry of Alsace-Lorraine

THE U.S. Consul at Strasburg states that, although chemical factories are situated in many parts of Alsace-Lorraine, the greatest concentration is in and about Mulhouse, Haut-Rhin, which is also the textile centre. The number of chemical plants and persons employed by them in the three Departments of Alsace-Lorraine is as follows:—Bas-Rhin, 75 plants, 2,865 employees; Haut-Rhin, 56 plants, 1,488 employees; Moselle, 39 plants, 1,731 employees.

The industry has eight important divisions: (1) Distillation of coal, petroleum, and wood; (2) acids, salts and industrial chemicals; (3) pharmaceutical products; (4) animal oils, glue, and fertilisers; (5) vegetable oils, candles, soap and perfumery; (6) colouring materials, inks, and varnish; (7) explosives and electro-chemical products; and (8) starch and dextrine.

U.S. Dye Imports for January

U.S. DYE imports for January amounted to 190,459 pounds, valued at $184,018. according to the Tariff Commission. The percentage of dyes by country of shipment in January was: Switzerland 50 per cent., Germany 27 per cent., France 11 per cent., England 6 per cent. Belgium 3 per cent., Canada 1 per cent., Italy 1 per cent., Holland 1 per cent.

U.S. Customs Decision

THE U.S. COURT OF CUSTOMS APPEALS has found that pyrazolon, an intermediate used principally in the manufacture of fast light yellow, is dutiable at the advertised selling price of the only American manufacturer, rather than at the entered value. Pyrazolon was imported by Sandoz Chemical Works and was sold to the Cincinatti Chemical Works, who are the only other home makers of fast light yellow and thus the only consumers other than the maker. It was found to be possible to make the finished product at a price to compete with the maker of the intermediate under the previous conditions.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, February 26, 1926.

THE Heavy Chemical market continues to be fairly active, the better demand reported last week being continued both for home and export.

Prices of home products remain practically unchanged, but there are one or two advances in continental material.

Industrial Chemicals

ACID ACETIC.—98/100% quoted £55 to £67 per ton, according to quantity and packing, c.i.f. U.K. port. 80% pure, £40 to £41 per ton; 80% technical, £38 to £39 per ton, packed in casks. c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flakes, £37 per ton; powdered, £39 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at about 4¼d. per lb., delivered or f.o.b. U.K. ports, in moderate demand.

ACID CITRIC, B.P. CRYSTALS.—Usual steady demand and price unchanged at about 1s. 3¾d. per lb., less 5%, ex wharf.

ACID FORMIC, 85%.—Now quoted £49 5s. per ton, ex wharf, prompt shipment. Spot material on offer at about £50 10s. per ton, ex store.

ACID HYDROCHLORIC.—In little demand, price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80%.—Remains unchanged at £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Rather cheaper quotations from the Continent. Now quoted 3¾d. per lb., ex wharf, prompt shipment. Spot material on offer at about 3¾d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—In rather poor demand, but quoted price unchanged at about 11¼d. per lb., less 5%, ex wharf.

ALUMINA, SULPHATE, 17/18%, IRON FREE.—On offer from the Continent at about £5 10s. per ton, c.i.f. U.K. ports. Spot material available at £6 5s. per ton, ex store.

ALUM, LUMP POTASH.—Quoted £7 15s. per ton, c.i.f. U.K. ports, prompt shipment. Spot material available at about £9 2s. 6d. per ton, ex store. Powdered quality on offer from the Continent at about £7 10s. per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—Continental material on offer at about 1s. 2d. per lb., ex station, containers extra and returnable. This price can be shaded for large quantities.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton; packed in 5-cwt. casks, delivered or f.o.b. U.K. ports. Industrial quality about £10 per ton less.

AMMONIA LIQUID, 880.—Unchanged at about 2¼d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £26 to £27 per ton, ex station. On offer from the Continent at about £22 10s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £18 15s. per ton, c.i.f. U.K. ports, prompt shipment from the Continent.

ARSENIC.—In rather poor demand, but prices remain unchanged. Spot material quoted £17 per ton, ex store. Offered for prompt shipment from works at £16 10s. per ton, ex wharf.

BARIUM CHLORIDE, 98/100%.—White crystals on offer from the Continent at about £8 12s. 6d. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—English material quoted £9 10s., per ton, ex station. Contracts 20s. per ton less. On offer from the Continent at about £7 15s. per ton, c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £22 10s. per ton; crystals, £23 per ton; powdered, £24 per ton, carriage paid U.K. stations.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental still dearer at about £4 10s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Quoted £3 17s. 6d. per ton, f.o.b. U.K. ports for export; about £3 10s. per ton, f.o.r. works for home consumption.

COPPER SULPHATE, 99/100%.—Price for British material, £23 10s. per ton, f.o.b. U.K. ports. Moderate inquiry for export. Continental on offer at about £22 per ton, ex wharf.

FORMALDEHYDE, 40%.—Spot material available at about £39 per ton, ex store. Quoted £38 per ton, c.i.f. U.K. ports to come forward.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental on offer at about £3 per ton, c.i.f. U.K. ports.

LEAD, RED.—Price for imported material reduced to about £40 10s. per ton, ex store. Quoted £39 15s. per ton, c.i.f. U.K. ports to come forward.

LEAD, WHITE.—On offer at £40 15s. per ton, ex store, spot delivery.

LEAD ACETATE.—White crystals on offer from the Continent at about £42 10s. per ton, c.i.f. U.K. ports. Brown quoted about £38 5s. per ton, c.i.f. U.K. ports. Spot material available at about £44 per ton, ex store.

MAGNESITE, GROUND CALCINED.—In moderate demand and price unchanged at about £8 15s. per ton, ex station.

POTASH CAUSTIC, 88/92%.—Syndicate prices vary from £25 10s. to £28 15s. per ton, c.i.f. U.K. ports, according to quantity and destination. Spot material available at about £29 per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE.—96/98% quality quoted £25 10s. per ton, ex wharf, early delivery. Spot material available at about £26 10s. per ton, ex store. 90/92% quality quoted £22 10s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99/100%.—A quantity of crystals available at £31 10s. per ton, c.i.f. U.K. ports. Powdered quality on offer at about £30 per ton, c.i.f. U.K. ports.

POTASSIUM NITRATE, SALTPETRE.—Quoted £22 15s. per ton, c.i.f. U.K. ports, prompt shipment. Spot material available at about £25 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot material quoted 8d. per lb., ex store. Offered for early delivery at 7¾d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Quoted 7¼d. per lb., ex store, spot delivery. On offer from the Continent at about 7¼d. per lb. c.i.f. U.K. ports.

SODA CAUSTIC.—76/77%, £17 10s. per ton; 70/72%, £16 2s. 6d. per ton; broken 60%, £16 12s. 6d. per ton; powdered, 98/99%, £20 17s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Position rather easier and supplies available at round about £20 per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station; M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English price unchanged at 3¾d. per lb., delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton more; alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 per ton, ex station. Minimum 4-ton lots. Pea crystals, £14 5s. per ton, ex station. Continental commercial quality offered £9 per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store; 96/98% refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE 100%.—Quoted £24 per ton, ex store. Offered from the Continent at about £22 5s. per ton c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Spot material now available at about 4¼d. per lb., ex store. Offered for prompt shipment from the Continent at a fraction less.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, ex works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—60/65% solid, £13 5s. per ton; broken, £14 5s. per ton; flake, £15 5s. per ton; crystals, 31/34%, £8 12s. 6d. per ton. All delivered buyers' works U.K. minimum 5-ton lots with slight reduction for contracts; 60/62% solid quality offered from the Continent at about £10 10s. per ton c.i.f. U.K. ports; broken, £1 per ton more; crystals 30/32%, £7 10s. per ton c.i.f. U.K. ports.

SULPHUR.—Flowers, £11 per ton; Roll, £9 15s. per ton; Rock, £9 15s. per ton; ground, £9 10s. per ton, ex store, spot delivery. Prices nominal.

ZINC CHLORIDE.—British material 95/98% quoted about £24 per ton f.o.b. U.K. ports; 98/100 solid on offer from the Continent at about £22 10s. per ton c.i.f. U.K. ports. Powdered about 20s. per ton extra.

ZINC SULPHATE.—Continental manufacture on offer at about £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

H. ACID.—3s. 3d. per lb. per 100%. Some home inquiries.

DIMETHYLANILINE.—1s. 11d. to 2s. per lb. Some home inquiries.

ANILINE SALT.—7d. per lb. Some home inquiries.

ALPHA NAPHTHYLAMINE.—1s. 3d. per lb. Fair home inquiries.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, February 26, 1926.

The demands for chemicals here during the past week has been moderate and beyond this one hesitates to say more. Buyers are coming along, but they are operating primarily to fill early requirements, forward business being confined to a comparatively small compass. Taken all round, quotations keep fairly steady, though there are here and there a few weak sellers about. Overseas business continues on a quiet scale and, for the moment, shows little sign of improvement. Continental demand is very slow and most of the export trade that has been done has been with the Colonies and the East.

Heavy Chemicals

Inquiry for phosphate of soda is still quiet, though quotations are steady at £12 7s. 6d. per ton. Bicarbonate of soda continues to be offered at £10 10s. per ton, but buyers are not coming forward to any important extent. Notwithstanding a rather slow demand for hyposulphite of soda values are keeping up very well, photographic quality being quoted at about £14 5s. per ton and commercial material at £9 10s. to £9 15s. Caustic soda is selling in fair quantities both for home use and for shipment, at from £15 2s. 6d. for 60 per cent. to £17 10s. for 76-77 per cent. quality. Sulphide of sodium is slow, though rates are practically without change; crystals are on offer at about £9 12s. 6d. per ton and 60-65 per cent. concentrated material at £11 10s. to £12. Values of chlorate of soda are steady at 3⅛d. to 3¼d. per lb., with business rather inactive. Alkali meets with a quietly steady demand at £6 15s. per ton. Acetate of soda is still quite firm and is now being offered at £19 10s. to £20 per ton. Bichromate of soda is selling only in small quantities and prices have an easy tendency at about 3¼d. per lb. Bleaching powder is still quoted at £8 10s. per ton. Glauber salts are quiet but unchanged at £3 5s. per ton, with saltcake in much the same position at about £3 per ton. Soda crystals keep steady and a fair business is being done at £5 5s. per ton. Prussiate of soda is still quoted at 4¼d. per lb., but current demand for this material is somewhat slow.

Caustic potash shows very little change either in position or value, and 90 per cent. quality is on offer at £27 10s. per ton. A fair demand for carbonate of potash is being met with and rates are quite steady at £26 per ton for 96 per cent. strength. Bichromate of potash is being offered at 4¼d. per lb., but the buying movement is slow. There is not much demand either for yellow prussiate of potash, though the value of this material is well held at 7¼d. per lb. Chlorate of potash is quiet but steady at about 4d. per lb. Permanganate of potash is selling in small quantities at 7¼d. per lb. for pharmaceutical and round 5½d. for commercial quality.

The price of arsenic is still weak, though about unchanged at £14 per ton, f.o.b., for white powdered, Cornish makes; little expansion of the demand can be reported. Sulphate of copper continues quiet at about £24 per ton. Acetate of lime is still very steady at £17 10s. per ton for grey quality and £8 5s. for brown. White acetate of lead keeps up, though there is not much in the way of demand; white is quoted at £44 per ton and brown at £39 to £40. Commercial Epsom salts are a slow seller, though quotations show little change at £3 10s. to £3 15s. per ton, with magnesium sulphate, pharmaceutical quality, steady at about £4 10s. per ton.

Acids and Tar Products

Although there is only a comparatively limited selling movement in most of the acids values are pretty steady in most sections. Citric acid is in quiet request at 1s. 3¼d. to 1s. 3½d. per lb. Tartaric acid is slow at about 11½d. per lb. Acetic acid is again offered at £36 to £37 per ton for 80 per cent. commercial material and £67 for glacial. Oxalic acid is quiet but fairly steady at 3⅝d. to 3¾d. per lb.

Pitch is still very firm here at 62s. 6d. to 65s. per ton, f.a.s., and some fair forward bookings have been made. Carbolic acid continues very flat, though nominally unchanged at 5d. to 5¼d. per lb. for the crystal and 1s. 5d. per gallon for crude. Creosote oil keeps fairly steady at 6¼d. to 6¾d. per gallon. Solvent naphtha is only in limited demand at round 1s. 6d. per gallon.

A British Snia Viscosa, Ltd.

Annual Meeting of the Italian Company

At the annual general meeting of the Snia Viscosa, Ltd. (Societa Nazionale Industria Applicazioni Viscosa), in Turin on Saturday, Signor Gualino said that subsidiary companies would be formed for the development of Sniafil and a British company was proposed, to be known as British Snia Viscosa, Ltd.

The profits were stated to be a record for any Italian company. The directors anticipated giving work during the current year to 25,000 persons and that the factories would be ready to produce 100,000 kilogs. daily. Signor Gualino gave the following statistics of the world's production of artificial silk:—

	About Kg.	Per cent.
United States	25,000,000	30·13
Italy	13,500,000	16·26
Germany	12,000,000	14·45
England	11,000,000	13·25
France	6,500,000	7·83
Belgium	4,500,000	5·42
Holland	3,000,000	3·62
Switzerland	2,500,000	3·02
Other States put together	5,000,000	6·02
World's production	Kg. 83,000,000	

The Snia production for 1925 was 9,506,475 Kg., which represented 70·30 per cent. of Italian production and 11·30 per cent. of the world's production. Last autumn the company's shares had been available in London and America. The company had produced "Sniafil," which dyed efficiently and mixed well with other fibres.

In the matter of industrial agreements the Chairman said that the company would carry on any such negotiations with a free and open mind. The modern trend of industry was all in the direction of great combines.

Other Artificial Silk Developments

The British and Northern Ireland Governments have guaranteed £125,000 towards the cost of the first artificial silk factory in Ireland, now in course of erection at Ballymena, Co. Antrim; the former to meet machinery costs of £85,000. The factory will start in three months.

The British Enka Co. hopes to start production at Aintree in the autumn. Some 700 persons will then be employed, including a few Dutch technical experts.

Lecturing on artificial silk at Flimby, Maryport, on Saturday, Februafy 20, Mr. J. E. Christopher, chemical engineer at Risehow Colliery, said that this country might produce an all-British artificial silk and suggested afforestation of land at present of little use. He commented on the great research work of a Carlisle establishment in producing dyes equal, if not superior, to German products. They had done more than firms that had obtained ten times more assistance from the Government, he said.

Courtaulds, Ltd., following their agreement, are with the Glanzstoff company of Elberfeld, preparing for the erection of new works at Niehl, near Cologne harbour. The companies are entering equally into the enterprise, which will be started at once, and 4,000 persons will eventually be employed.

The Duke of York, as president of the Industrial Welfare Movement, visited the works of Courtaulds, Ltd., at Bocking and Halstead, Essex, on Monday. He inspected various departments, including the dyeworks, and was interested in special lighting apparatus, whereby fabrics are subjected to the equivalent of 14 days' sunlight for testing fastness to light.

A company known as Soc. Anon. Seta Bemberg has been formed in Italy, under the auspices of J. P. Bemberg A.G., of Barmen, for the manufacture of artificial silk by the cuprammonium process. This Italian company, of which the president is Mr. Ivo Walter and the managing director Mr. E. de Goumoens, has a capital of 12,000,000 lire, and is now constructing a factory at Gozzano (Province of Navara). It is hoped to begin production towards the end of the summer. This will be the only mill in Italy producing cuprammonium silk.

Company News

SHAWINIGAN WATER AND POWER.—A dividend of 2 dols. per share is announced for the quarter ending March 31.

CANADA CEMENT CO.—The profits for the year 1925 amounted to $1,699,243. The ordinary dividend is maintained at 6 per cent.

NORTH BROKEN HILL, LTD.—Dividend, No. 65, of 2s. and a bonus of 3s. per share, less tax, have been declared, payable on March 29.

INTERNATIONAL PULP AND CHEMICAL CO., LTD.—An issue of 600,000 8 per cent. cumulative participating preference shares of £1 each at par made on Tuesday was largely oversubscribed.

BRITISH DRUG HOUSES, LTD.—An offer for sale was made on Thursday of 255,500 ordinary shares of £1 each at par. These form part of a total authorised issue of £400,000 ordinary and £242,000 5 per cent. preference capital. Out of the proceeds of the present issue a debenture for £200,000 is to be repaid.

INDESTRUCTIBLE PAINT CO.—The report for the year 1925 shows a net profit of £23,300, and £1,406 was brought forward. A final dividend of 5 per cent. is proposed, making 10 per cent. for the year. The directors recommend transferring £4,000 to reserve for income tax, writing £3,442 off goodwill, adding to the reserve £7,500 and carrying forward £2,264.

YORKSHIRE INDIGO, SCARLET AND COLOUR DYERS.—The accounts for 1925 show a loss of £3,903, but a surplus of £3,536 was brought forward. In order to meet loss on trading, interest on debenture stock, and to provide the dividend on the cumulative preference shares, the board have transferred £7,000 from the reserve and £3,000 from the investment reserve. The debenture interest absorbed £4,573, and a dividend of 5 per cent. is proposed on the preference shares, carrying forward £1,184.

SNIA VISCOSA, LTD.—After making the customary deductions for amortisations the net profit for the past twelve months amounted to L.148,482,776·22, out of which L.10,000,000 is place to ordinary reserve and a similar amount to extraordinary reserve. The directors propose to distribute to the shareholders 12½ per cent. dividend, equal to L.25 per share on the 3,000,000 shares; having right to the dividend as from January 1, 1925, leaving a balance of L.52,235,434 to be carried forward.

MELSO, LTD.—The net profit for the year was £60,008. This enables the directors, after providing £6,314 for taxation, to extinguish the whole of the formation expenses, £17,058, and, after paying the fixed 7½ per cent. preference dividend and transferring 20 per cent. of the remaining profits—that is, £5,467—to reserve (in accordance with the articles), to pay 10 per cent. on the ordinary capital and a further 2½ per cent. (making the maximum dividend of 10 per cent.) on the preference shares.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

SOYA OIL.—Commission agents in Valparaiso wish to represent British manufacturers of above. (Reference No. 225.)

CHEMICALS, ETC.—Leeds Tramways Committee invite tenders by March 2 for supply of chemicals, acids, oils, paints, soaps and cement. Specification from W. Chamberlain, 1, Swinegate, Leeds.

TAR.—For the supply of 40,000 galls. of dehydrated coal tar, No. 2, for Erith U.D.C. Forms from Engineer, Council Offices, to be returned by March 6.—100 tons refined tar, No. 1, for Rugby U.D.C. Forms from Surveyor, Benn Buildings, to be returned by March 6.

OILS AND FATS.—A British subject at present in London wishes to represent British exporters of above in Italy. (Reference 253.)

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following trade marks can be lodged up to March 17, 1926.

"BELCO."

465,966. Lacquers, varnishes, enamels, paints, dry colours, distempers, japans and anti-corrosives, oils. Class 1. Necol Industrial Collodions, Ltd., Nobel House, 2, Buckingham Gate, London, S.W.1; manufacturers. January 9, 1926.

"EVERSAN."

465,038. For disinfectants. J. R. Marsden and Co., Ltd., 83, Institution Street, Leeds, and 4, Butts Court, Leeds; engineers and chemical manufacturers. December 7, 1925.

"ACIDILAMIN."

457,565. Chemical substances prepared for use in medicine and pharmacy. Class 3. Aktien-Gesellschaft für Anilin Fabrikation (a joint stock company organised under the laws of Germany), Am der Treptower Brucke, Berlin, Germany; manufacturers. March 26, 1925. (To be associated, Sect. 24.)

"DETOXINUM."

463,364. Chemical substances prepared for use in medicine and pharmacy. Class 3. Johann Abraham von Wolfing, 231, Friedrichstrasse, Berlin, S.W., Germany; manufacturer. October 19, 1925.

"PINEATE."

464,784. Chemical substances prepared for use in medicine and pharmacy. Class 3. The Saccharin Corporation, Ltd.; 72, Oxford Street, London; manufacturers of and dealers in pharmaceutical products. December 1, 1925.

"SAPT."

465,182. Raw or partly prepared vegetable, animal and mineral substances used in manufactures. Class 4. John William Vernon, trading as J. W. Vernon, 2, Bradshaw Street, Manchester; cotton and waste merchant. December 11, 1925.

"CARBOLINEUM."

B443,804. For wood preservative. Class 1. C. A. Paters, Ltd., Stores Road, Derby; manufacturers, merchants and exporters. December 19, 1925.

"KLEARTRAK."

461,960. For paints, colours, varnishes enamels in the nature of paints and anti-corrosives. Class 1. The firm trading as Hull Chemical Works Co., Coronet Oil Works, Kirkby Street, Kingston-upon-Hull; manufacturers. September 3, 1925.

"SPECIFENE."

465,509. Chemical substances prepared for use in medicine and pharmacy. Class 3. Higgolene, Ltd., 137, Upper Bond Street, Hinckley, Leicestershire; manufacturing chemists. December 22, 1925.

"CONCOL."

466,031. For raw or partly prepared vegetable animal and mineral substances used in manufactures. Class 4. The Consumers Co., Ltd., 37 to 41, Gracechurch Street, London, E.C.3; manufacturers. January 12, 1926.

"LAXAMINT."

466,440. For chemical substances prepared for use in medicine and pharmacy. Class 3. International Chemical Co., Ltd., 7, Wybert Street, Munster Square, London, N.W.1; manufacturing chemists. January 26, 1926.

Tariff Changes

BRITISH INDIA.—Novocaine and preparations of it are now exempted from import restrictions.

BRITISH GUIANA.—Revisions give the following rates of import duty.—Pitch and tar, *ad valorem*, British Preferential Tariff, 20 per cent.; general tariff, 40 per cent.: Salt, fine, per 100 lb., B.P.T., 75 cents. General, $1.50.

UNITED STATES OF AMERICA.—Investigation under "Flexible Tariff" provisions has been ordered into the production costs and conditions of precipitated barium carbonate and fluorspar.

The

"VITREOSIL"

System *of* HYDROCHLORIC ACID ABSORPTION

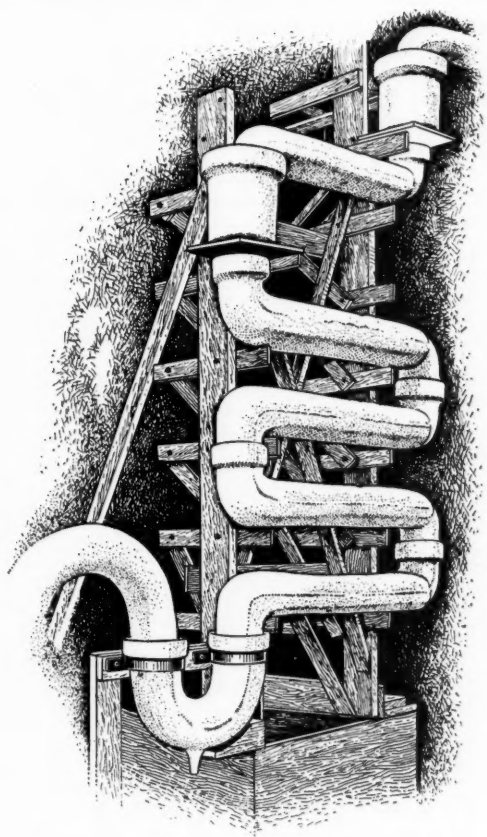
THESE VESSELS set up Vertically one above the other can be thoroughly Water Cooled.

Economies of Floor Space and Efficiency of Operation are secured. There are no submerged joints.

In this System an intimate contact of the gas with the liquid is secured by means of the liquid curtain formed by the drops falling from the central depression and through which all the gas must pass.

Let us know your Problems

WRITE FOR DESCRIPTIVE LITERATURE



COLUMN OF "VITREOSIL" ABSORPTION VESSELS.

Specialists in Chemical Works Plant. ***Manufacturers of VITREOSIL.***

THE THERMAL SYNDICATE, Ltd.

VITREOSIL WORKS

WALLSEND-ON-TYNE, ENGLAND

London Depot: 28 Victoria Street, London, S.W.1 And at New York and Paris

Telephone Nos. 42 & 43 Wallsend. Telegrams: "Thermal, Wallsend."

ABC Code, 5th and 6th Editions, and Bentley's used.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry" of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

DAGG, Richard, Carlton Road, Farnworth, paint manufacturer. (C.C., 27/2/26.) £11 6s. 8d. November 20.

STANSFIELD, John L., Boothfold, Waterfoot, Manchester (trading as HANDFIELD CHEMICAL CO.), chemical manufacturer. (C.C., 27/2/26.) £23 1s. 8d. January 26.

Receivership

LOW TEMPERATURE CARBONISATION, LTD. Sir William McLintock, K.B.E., C.V.O., of 71, Queen Street, E.C.4, has been appointed receiver and manager for the 6 per cent. 1st mortgage debenture stock holders.

Bill of Sale

ANDREW, Arthur Reginald, 4, Rookfield Avenue, Muswell Hill, manufacturer, importer and exporter and chemists' sundriesman (B.S., 27/2/26). Filed February 18. £300.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

HEPPELLS, LTD., London, S.W., chemists. (M., 27/2/26.) Registered February 5, charge, etc., securing £56 per annum, to Norwich Union Life Insurance Society; charged on 164 and 165, Piccadilly, W. *£48,000. October 26, 1925.

HOLROYD (HENRY) AND EDMONDSON, LTD., Leeds, dyers and finishers. (M., 27/2/26.) Registered December 23, £11,000 debenture dated December 4, 1925, to H. Holroyd, The Grange, Topcliffe Common, near Thirsk; general charge *£11,000. December 28, 1925.

RANDALL (T.) (LUTON), LTD., bleachers. (M., 27/2/26.) Registered February 12, £4,500 debenture to Branch Nominees, Ltd., 15, Bishopsgate, E.C.; general charge. *Nil. April 6, 1925.

TAYLORS' DRUG CO., LTD., Leeds. (M., 27/2/26.) Registered February 13, £850 mortgage to Mrs. I. Crawford, 6, St. Mary's Road, Newton Park, Leeds; charged on property in Harrogate Road, Chapel Allerton. *£138,567 4s. 6d. November 9, 1925.

Business Names Registered

[*The following (trading name and address, nature of business, date of commencement, and proprietors' names and addresses) have been registered under the Registration of Business Names Act.*]

FELL-DALES CHEMICAL CO., Rose Crown Yard, Strickland Gate, Kendal, chemical manufacturers. January 1, 1926. John Cyril Mayfleet Battle, 14, Hamilton Road, Lincoln; John Fredk. Battle; Alfred Ernest Owen; Harold Marfleet Battle; George Herbert Hayward, and Arthur Leonard Bower.

New Companies Registered

BRITISH TAROLEUM CO., LTD., 83, Bridge Street, Manchester. Registered February 15, 1926. Tar and chemical manufacturer. Nominal capital, £10,000 in £1 shares.

FREE STATE CANDLE CO., LTD., 22, Great St. Helen's, London, E.C.3. Registered February 18, 1926. Producers, manufacturers of and dealers in candles, oils, greases, glycerine, etc. Nominal capital, £20,000 in £1 shares.

HULSE (DYES), LTD., Old Mill, Woodlesford, near Leeds. Registered February 18, 1926. Manufacturers of and dealers in dyes and dyestuffs and their intermediates, etc. Nominal capital, £100 in 1s. shares.

PHILLIPS, POLITZER AND CO., LTD., 35, Queen Street, London, E.C.4. Registered February 20, 1926. Furriers, bleachers, dyers, manufacturing chemists, etc. Nominal capital, £175,000 in £1 shares.

SOUTH KNIGHTON DYE WORKS, LTD. Registered February 10, 1926. Cotton, yarn, silk, and general bleachers, etc. Nominal capital, £15,000 in £1 shares (7,500 ordinary and 7,500 preference). Solicitors: Bray and Bray, 5, Welford Road, Leicester.

H. AND L. WHITE, LTD., 11, Union Street, Southwark, London, S.E.1. Registered February 15, 1926. Wholesale, manufacturing and retail chemists, etc. Nominal capital, £100 in £1 shares.

Latest Government Contracts

THE latest contracts placed by the various Government departments include the following:—

Admiralty

CIVIL ENGINEER-IN-CHIEF'S DEPARTMENT.—Portland Cement: Smeed, Dean and Co., Ltd., Murston, Sittingbourne; The Cement Marketing Co., Ltd., London, S.W.

CONTRACT AND PURCHASE DEPARTMENT.—Buckets, Acid: Lorival Mfg. Co. (1921), Ltd., Southall. Candles: Palmer and Co., Ltd., London, E. Electrodes: Alloy Welding Processes, Ltd., London, N. Fire Extinguishers: The Pyrene Co., Ltd., London, S.W. Linseed Oils: Dixon and Cardus, Ltd., Southampton; Smith Bros. and Co., London, E.; Younghusband, Barnes and Co., London, S.E. Manganese Bronze Ingots: Manganese Bronze and Brass Co., Ltd., London, S.W. Red Lead: London Lead Oxide Co., Ltd., Gravesend.

War Office

Aluminium Ingot: British Aluminium Co., Ltd., Warrington. Calcium Hydrate and Soda Ash (mixed): Sofnol, Ltd., London, S.E. Chemical Apparatus: Townson and Mercer, Ltd., London, E.C. Compressor, Air: Alley and MacLellan, Ltd., Glasgow. Copper Ingot: Brandeis Goldschmidt and Co., London; British Metal Corporation, Ltd., London. Nickel: Mond Nickel Co., Ltd., Clydach. Soap, Brown Windsor: Jos. Watson and Sons, Ltd., Leeds. Zinc: British Metal Corporation, Ltd., London, E.C.; H. Gardner, and Co., Ltd., London, E.C.

Air Ministry

Extinguishers, Fire: Foamite Firefoam, Ltd., London, W. Extinguishers, Fire, Refills, for: General Fire Appliance Co., London, E.C. Film Developing Apparatus: Barr and Stroud, Ltd., Glasgow; Joseph Sankey and Sons, Ltd., Bilston. Fluid Disinfectant: Sanitas Co., Ltd., London, E. Methylated Spirit: Methylating Co., Ltd., London, S.W. Oil, Castor: Hull Oil Mfg. Co., Ltd., Hull; Premier Oil Extracting Mills, Ltd., Hull. Oil, Mineral Lubricating, for Motor Vehicles: Sterns, Ltd., London, E.C.

Post Office

Carbonic Acid Gas: John Bennett, Lawes and Co., Ltd., London, E. Hydrometers: Thos. O. Blake, London, E.C. Oil, Lubricating: Anglo-American Oil Co., Ltd., Purfleet or Manchester. Spirit, Motor: Alex. Duckham and Co., Ltd., London, E.

H.M. Office of Works

Fire Extincteurs, etc.: The Valor Co. Ltd., London, S.W. Tar (Dehydrated): The Gas Light and Coke Co., London, E.C.; The Hampton Court Gas Co., Hampton Wick.

Crown Agents for the Colonies

Bitumen Spraying Machines: The Phœnix Engineering Co., Ltd., Chard. Cement: T. Beynon and Co., Ltd., London; E.C.; The Cement Marketing Co., Ltd., London, S.W. Dynamite, etc.: Nobels Explosives Co., London, S.W. Lymph: The Lister Institute, Acton Castle, Marazion, Cornwall. Novarsenobillon: May and Baker, Ltd., London, S.W. Patent Metals: The Manganese Bronze and Brass Co., Ltd., London, S.W. Quinine: Howards and Sons, Ltd., Ilford, Essex. Sulfarsenol: Wilcox, Joseau and Co., London, W.C.